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ABSTRACT

This report provides a brief description of a 1988 conference on distance education together with papers from 31 of the 44 sessions, including keynote addresses and presentations at general and informational sessions and application seminars. These sessions addressed the conference theme from different perspectives, and included consideration of instructional design, the teaching process, faculty development, administration/management, continuing education programming, and university/K-12 collaboration. Specific topics examined include the changing role and future of distance education and training; the Annenberg/Corporation for Public Broadcasting Project; correspondence study and the new media; audio and video teleconferencing; interactive media education; distance education in rural areas; joint college/school distance education programs; and change strategies for the adoption of technology. The text is supplemented by various figures, and many of the papers include references. (EW)

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Fourth Annual Conference on Teaching at a Distance

Changing Roles in Education and Training

Madison, Wisconsin

August 2-4, 1988

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Fourth Annual Conference on Teaching at a Distance

CHANGING ROLES IN EDUCATION AND TRAINING

Madison, Wisconsin
August 2-4, 1988

The Fourth Annual Conference on Teaching at a Distance was held in Madison on August 2-4, 1988. The conference was attended by 250 participants from throughout the United States and Canada as well as other countries. The program included 44 sessions--keynote addresses, general sessions, informational sessions and application seminars. The sessions addressed the conference theme from different perspectives and covered instructional design, the teaching process, faculty development, administration/management, continuing education programming and university/K-12 collaboration.

This report contains material presented at the conference. The material provides a good overview of the kinds of issues, problems, solutions and opportunities discussed during the program.

Tape recordings of the keynote presentations and general sessions are available for purchase. Audio tapes may be ordered from William Braun, Instructional Communications Systems, University of Wisconsin-Extension, Old Radio Hall, 975 Observatory Drive, Madison, WI 53706; (608) 262-4342. For your convenience, an order form is provided at the back of the book.

We hope the conference material will be useful to you.

Terry Gibson, Ph.D.
Associate Professor
University of Wisconsin-Madison

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4th Annual Conference On Teaching At A Distance
Panel Discussion: Changing Roles In Education and Training

Terry Gibson, David Gueulette,
Ronald Bornstein, Gary Meister

TERRY GIBSON:

First of all, I'd like to welcome you to Madison, Wisconsin. My name is Terry Gibson. I'm a faculty member here at the University of Wisconsin-Madison, and we're looking forward to an exciting conference. This is the Fourth Annual Distance Learning Conference. We are thrilled that every year that we have done this we have had an ever larger group. We have 250 people registered for this conference. We have participants from 32 states in the United States, four provinces of Canada, and the countries of England and France. It is a great opportunity to learn not only from our resource people on the program but also learn from each other.

Our conference theme this year is a very important one, and that is Changing Roles in Education and Training. As we look at how distance education has evolved in the last years and how education in general has evolved, we see some pretty dramatic changes in roles relating both to education and training. As we look at the learner, we find that the learner is looking at new ways to learn and perhaps has the need to overcome some old habits. We find learners now learning via television, radio, audio cassette, video satellite, computer, and print media. We're asking different things of learners than we've perhaps asked in the past. As we look at the instructors, we're asking for different skills and talents than the traditional instructor might have. Whether in the college classroom or in the corporate classroom, we're looking at new standards of excellence for distance learning. We're also looking at a situation that removes instructors from the privacy of a classroom to the public view of distance learning systems. There is also the threat of potential competition from master teachers.

As we look at institutions, we see new roles there too, with new programs, new technologies, new requirements for program quality, new structures, new services, new boundaries, and perhaps some new competition. Here in Wisconsin, home of the Wisconsin Idea that the boundaries of the campus are the boundaries of the state, we are no longer finding that Idea is to be necessarily true. Our educational programs via distance learning have the potential of crossing state boundaries, as do your programs, and that has some real implications. As we look at society there are implications as well with a market economy. We find that in the corporate sector, education is no longer just public service. It has also become a profit center in the corporate world.

There are, indeed, many changing roles in education and training that involve the learners, the instructors, our institutions, and society. At this point I would like to introduce three distinguished panelists who will address some of these changes. They are David Gueulette, Professor of Instructional Technology at Northern Illinois University; Ron Bornstein, Vice President, University Relations for the University of Wisconsin System; and Gary Meister, Human Resource Development Coordinator for AAA-Wisconsin.

So let me begin by introducing Dave Gueulette, Professor of Instructional Technology at Northern Illinois University. He is a professor, an author, and a researcher in instructional applications of technology to adult learners. He is a member of the editorial boards of the American Journal of Distance Learning, and Lifelong Learning, the Adult Years. So it is my real pleasure to have Dave with us here today.

DAVID GUEULETTE:

I thought that I might title my opening remarks "Is it Real or is it Memorex" because this idea comes from a very real story that happened at Northern Illinois University about six months ago. A colleague of mine runs a media center, and he's responsible for teleconferences. We have perhaps half a dozen or so teleconferences a year. One was on discipline in the school classrooms, and it was coming from one of the national networks. Nobody showed up and this is usual for some of the teleconferences we have at Northern. This is distressing because we try to make money on them. Anyway, my colleague, who is very enterprising, thought well I'll tape it. We often get permission to tape the programs. The next day about twelve teachers showed up; and they said, well we're here for the teleconference. Pete said oh, I must have gotten the wrong information. He looked back in his notes and sure enough he had been given the wrong date. He scrambles back and puts the cassette in the machine. He's got two or three monitors set up because they have them in the classroom all the time. The program goes on and there is a discussion, questions going back and forth, and about an hour and a half later people were coming out and saying, Pete this is one of the best teleconferences you've ever had.

We joke about this program because it is very humorous on the surface, but it also suggests something, at least for me. It suggests that maybe it's not so important what happens at the sending end, but what happens at the receiving end. With that idea in mind I've begun to look at what happens at the receiving end of video teleconferences. My remarks today are going to be directed not so much to the content of the materials in audio or video programs, but to what we educators are going to have to respond to if our roles change, if we become facilitators of these Memorex events wherever they may be.

The true title of my presentation is Video Teletraining for Adult Learning, and I will suggest a few things for you here. Adult educators and media specialists have become so caught up in the production and operation of tools to aid learning that we are losing sight of the techniques which the tools are to serve. Captivated by the new technology we educators fail to understand the real potential and implication for education such devices hold. Instead we immerse ourselves in ends as opposed to means of the media, losing sight of the fact that it is the people who are central to a learning process. Malcolm Knowles, a well-known adult educator, has best expressed this notion in his definition of a democratic philosophy of adult education.

A democratic philosophy is characterized by a concern for development of persons, a deep conviction as to the worth of every individual, and faith that people will make the right decisions for themselves if given the necessary information and support. It gives precedence to the growth of people over the accomplishment of things when these two values are in conflict. It emphasizes release of human potential over the control of human behavior. In a truly democratic organization there is a spirit of mutual trust, an openness of communications, a general attitude of helpfulness and cooperation, and a willingness to accept responsibility, in contrast to paternalism, regimentation, restriction of information, suspicion, and a forced dependency on authority.

In order to apply this philosophy to the organization of adult education, Knowles identifies the elements of the structure of adult learning as it differs from conventional learning and he terms his approach "andragogy, an emerging technology". He calls it technology, interestingly. The learners perceive the goals of the learning experience to be their goals. The learners accept a shared responsibility for planning and operating a learning experience and, therefore, have a feeling of commitment toward it. The learners participate actively in the learning process. The learning process is related to and makes use of the experiences of the learners; the learners have a sense of progress toward their goals.

The challenge presented to the teacher by these fundamentals of adult education to adapt or develop teaching tools compatible with the participation of learners is indeed important. Such participation requires interaction between the learners and a learning experience. John Haney and John Ullmer and other educational technology specialists have identified special categories of instructional media called interactive media. The communication instruments in this grouping have a characteristic of presentation media at the same time they actively involve the learner in a way that incorporates responses at a deeper level than just viewing and listening. Thus, interactive media require that the learner interact with the medium, not just react to it,

through one of many forms: writing something, saying something, manipulating something, or completing or cooperating with other learners. The appropriate educational uses of video teleconferencing, or telelecturing, or teletraining potentially interactive media, present special problems for educators. Many of these, I'm sure, you have faced.

It is probable that many of us are misusing broadcast video in all of its forms. We are often not using television in planned and effective ways to support instructional objectives. From research on using television for instruction, we note some very important considerations for using the media that can improve learning. The following significant and well-accepted findings of research by Schramm, Chu, and others, constitute the foundations of guidelines for effective use of all sorts of television instruction.

Here's some things we know about T.V. that I think figure prominently in how we begin to use video at the end site. (1) It is most effective as a tool for learning when used in a suitable context of learning activities at the receiving end. (2) Television is more likely to be efficient to a learner if it is planned and organized efficiently. (3) Whether a television program is used as a part of a lesson or as a lesson itself, makes no difference. (4) Repeat showings of T.V. programs will result in more learning up to a point. But a directed follow-up is more effective than a second showing of the same program. (5) Television programs can be shortened and still achieve minimum instructional objectives. (6) Instructional television appears to be equally effective with small and large viewing groups. (7) Whether instructional television can teach students who view at home as effectively as students in the classroom seems to depend upon other conditions. (8) Students will learn more from instructional television under motivated conditions than under unmotivated conditions. (9) Learning from television by the students does not seem to be handicapped by the lack of prompt feedback to the instructor. (10) The lack of opportunity for students to raise questions and to participate in the discussion would seem to reduce the effectiveness of learning from instructional television, particularly if the students are fairly advanced or the material is relatively complicated. (11) If a student being taught by instructional television can be given immediate knowledge of whether he/she has responded correctly, he/she will learn more. (12) Practice, whether by overt or covert response, will improve learning from T.V., if the practice is appropriate to the learning task and if the practice does not constitute an interference. (13) At the college level, students tend to prefer small discussion groups to T.V. classes and T.V. classes to large lecture classes. (14) Favorable attitudes are distributed widely enough among different television courses to cast doubt on the assumption that some academic subjects, per se, may be not suitable for television. (15) Liking T.V. is not always correlated with learning from it. (16) Among the factors that determine pupils attitude toward T.V. are; how much

interaction they think they will have with the teacher, how they compare the relative abilities of the studio and classroom teachers or presenters, whether they find T.V. boring or interesting, the nature of the television program they have seen, and the conditions for viewing.

I've listed about a dozen major points I think have direct bearing on how we could formulate some guidelines for use at the receiving end. Let me share some of these with you. These generalizations for using T.V. for instruction can be collected to formulate a set of guidelines for video teletraining. Several basic rules for integration of T.V. into instruction are easy to understand and to apply and can improve the use of the medium markedly.

First, select good teletraining programs that can be used to support instructional activities; try to preview them or have some access to them before they're broadcast if possible. Ask yourself if the program is of good technical quality, does it have appropriate content, will it fit instructional objectives, can it be used effectively, does it generate activities or discussion, can it be taped for later use.

Second, plan how the broadcast will be used in an actual lesson or class activity. Remember that T.V. is very powerful for introducing new ideas, summarizing points of view, giving visual support, enriching and expanding viewers worlds, exploring feelings, clarifying special points and reinforcing key concepts.

Third, prepare the audience for the television experience. You can do this by mentioning some of the things that may be going to happen based upon what you may know about the programming or some pre-broadcast materials that you may have had a chance to explore. Discuss with the viewers what to expect to find in the segment; provide questions or comments that will assist them in assessing the points in the program. Discuss with the audience what they will expect to get out of the activity. Review with the viewers what to watch or listen for and what to remember or to take down in notes. Plan what you will do after viewing the video.

Fourth, show the program remembering that you can ask questions, you can discuss, you can raise points, even while it's on. At the end, follow-up the video experience with something, with summaries, discussions, questions, with what I call "viewing group activities" where there is some chance to interact with the content and to the mediation.

Finally, evaluate the experience, making some comments about whether you might want to use this particular series or presentation again. If you have it on tape, do you want to show it in that form, and do you need to modify how you use the program or the follow-up activities. Also, keep track of programs that you have used and evaluate them and decide how they

should be integrated into learning experiences in the future.

In summary, the basic rules are simple and effective. The instructor must play a positive role in the use of television for instruction. Very probably we will all be using more and more video for teletraining and we must use it judiciously and correctly. Additionally, we must not forget to become and to help our students to become active, critical television viewers, able to understand the strengths and weaknesses of the medium and the roles that it plays in educating and shaping the values of our society. Educators must assume leadership roles in the application of the process of interactive media coupled with mass communications systems to support the democratic principles of education and the effective and potentially liberating possibilities of these existing technologies.

TERRY GIBSON:

Thank you very much, Dave. Let me go to the next panelist, Ron Bornstein. Ron is Vice-President of University Relations for the University of Wisconsin System. Ron is a recognized leader in telecommunications at the state and national level. He has been recognized for his work with the Corporation for Public Broadcasting and National Public Radio. He has also been recognized for his work in public policy developments in telecommunications.

RON BORNSTEIN:

I've chosen as a fun title for my remarks, "On the Good Ship Education". If you ask why that title it's because a former chancellor at the University of Wisconsin-Madison used the analogy of higher education being like a battleship. I thought it has always been a pretty reasonable analogy because it does have a large complement of people on board, it is steady in the water, it is very slow to get started, it's relatively invincible to unfriendly forces, it's hard to stop, and it's really a son-of-a-gun to turn around.

Besides naval analogies, Terry commented earlier about the very special conditions that the University of Wisconsin has with respect to the Wisconsin Idea coined by a former president, Charles Van Hise, that the boundaries of the university are the boundaries of the state. It was his artful way of describing the special outreach responsibilities that higher education has to its citizens regardless of location, economic, or educational status. In carrying out Van Hise's vision and in extending the boundaries of the campuses then and now, the battleship of education has encountered and often overcome turbulent seas of change. It has not been easy and it's even more difficult now, given limited resources, record enrollments (at least in our University of Wisconsin system), and the demographics of an increasingly graying faculty and set of administrators, many of whom grew up with, are used to, and will always prefer

traditional ways of teaching.

Like many of you, I have witnessed a good many half-hearted attempts to alter only slightly the direction of the educational battleship in what can probably be described as an honorable salute to technology. Erratic attempts at employing media on campus and in distant teaching, though often well intentioned, have often been misdirected. The admirals in charge, pursuing this analogy to its very end now, have been bitten and smitten by the bells and whistles of specific technologies. Too often they fail to base their use of instructional technology on defined need. They have not brought their faculty and students up to speed through inservice training, training designed to increase understanding of where and how telecommunications can best improve educational quality and accessiblity.

Education in general, and I speak of it not only here in Wisconsin but as a part-time consultant working with a number of other states in the last several years, has not paid sufficient awareness to the fact that telecommunications - satellite, computers, video conferencing, just to name a few - have forever broken down and redefined traditional educational and geographic boundaries. Education clearly is no longer bound by campus, city, county, or state communities; and we have now to deal with communities with interests that indeed transcend individual, institutional, and state lines. That's evidenced clearly at this conference by the impressive display of people from throughout the United States and the world. Some of you have moved into voids created by the inability of traditional education to increase speed or turn the direction of the battleship to respond to the kinds of times in which we live. One example is the growing problem experienced by secondary and post-secondary schools in remote areas in various states around the country as they attempt to continue mandated education in specialized courses such as math, science, foreign language, technical courses, and the like. The inability to do so, places the continuation of the local schools at-risk. It makes them prime candidates for increased consolidation.

I was on a consulting assignment about a year ago in the state of North Dakota. Dick Rail, the Director of the Office of Management and Budget, said to me that when the school dies in one of our towns, the town dies and when the town dies, good people leave the area and then they leave the state. To avoid this problem, schools and towns and coalitions of rural electric cooperatives, independent telephone companies, and local officials are presented with a host of quick-fix and often less than first-rate solutions. Regretably, the inertia of education has provided clear sailing for others to move into what was once regarded as very safe and protected territorial water. I call them "telepreneurs". Those telepreneurs have seized opportunities to use satellites or cassettes to deliver courseware that, while often times glitzy, does not necessarily effectively deliver quality education to reasonable numbers of

students or use fully accredited personnel or meet the admission requirements of local or regional universities.

It's clear that many of our institutions have come to the party too late and with too little to offer to today's brand of consumers on campus, at their homes, or in their workplace. As our educational battleship continues to plod ahead, often at slow or half speed, it witnesses a new fleet of competitors who have emerged as active and often very successful claimants for limited funding at the state and national level.

Others though, in education, act in quite different ways. They are the impulsive or wholistic educational seekers. There are educational administrators who want to jump ship for a cruise on the USS Technology principally for the sake of being with it. They want to be able to publicize their institution as a true video-versity with photos of students at CRT's, spinning computer graphics, and cassettes, disks, cameras, lights, and action. Many find soon enough that their ships list to one side. Too often those impulsive seekers are seduced and driven by a particular technology rather than by substantive need or the use of a variety of technologies to respond to those needs. They are the folks who believe that satellites are the answer. Or that fiber-optics is the solution or that a computer in every classroom and dorm room is the solution and only full motion video conferencing is the real solution. I think you get the picture. Those seekers don't know really what they want, but they're driven by the desire to be more competitive, to somehow become more electronic in their ways and their press releases. In the process their faculty crew feels as if they've been shanghaied because they don't receive the necessary tender loving care, time, and attention to help them learn new ways so they can research, teach, and work smarter.

In such cases where the battleship of education lies dead in the water or moves along at limited speed in the information age, inevitably campus resentment builds, frustrations heighten, faculty members become disinterested, legislators wonder why and how their state funded entities fail, do nothing or appear to do nothing as the world passes them by. In some cases crisis management sets in and then the brigades of bells and whistles vendors come calling with genie-like solutions to the latest problem.

We also have a case, many cases, in higher education of apoplexy when administrators face the increased cost of dealing with the information age. They're confronted by a realistic price tag for meaningful change. Their near-sighted focus in start up costs and operating costs ignores the very distinct benefits and opportunities of change both in the short and long term. In turn the legislative branches of government, who rely on education as agents of change, also remain locked into traditional ways. For example, here in Wisconsin and in other states, we have a capital

building committee called the State Building Commission which has grown up in a tradition that the only thing worth bonding for, generally, is bricks and mortar. When you offer a technological solution that may avoid an enormous capital cost now and later, it takes a great deal to educate those people, moving them from the brick and mortar age to the age of technology as a legitimate means of funding some of the tele-communication needs.

Fortunately, I think, there are some constructive ways to avoid these kinds of problems that we face at the legislative level, at the university level, with our faculty, and our staff members. They include developing a meaningful long-range strategic plan for the implementation of funding of telecommunications on an institutional and systematic basis. That's not an easy task but it's absolutely necessary and it can be productive.

As part of the planning process, another factor is inviting all the players to the table. If we are no longer bound by the terrestrial mentality of certain territories, then we also ought to recognize that in the age of modern technology we have a whole set of allies who certainly have a role to play in whatever we do here at the University of Wisconsin System. These include internal decision makers and external decision makers. In our case bringing to the table people from the State Department of Public Instruction, the vocational/technical adult system, the department of administration, and the public broadcasting entity in Wisconsin called the Educational Communications Board.

A third way is to invite responsible vendors - I underscore responsible vendors - to serve in the planning process not as full participants but as observers and resource people. A fourth way is to understand, through a good environmental scan, what and who is out there to help you separate the wheat from the chaf or, as we say in Wisconsin, to sift and winnow which regional and national organizations can provide quality services as opposed to those who are merely selling an inferior product wrapped up in a wonderful technological package.

Finally, and I think <u>the</u> most important, is the kind of top level commitment that you must have to steer the battleship in new and often unchartered waters. That commitment should ideally come from the top, but I assure you it can come from the bottom if there is a dedicated cadre of faculty and staff who want to push hard enough and long enough.

Despite the strange waters, going back to the analogy one more time, the battleship of education is slow and cumbersome; but it is a tremendous force in our society. We need to have the rust removed, the engines modernized, the crew upgraded, the equipment replaced with modern technology. It is not inexpensive, but there is an enormous payoff in productivity. And I think we have to do a much better job in communicating the benefits not only internally within our respective educational institutions, but externally to decision makers at the state and federal level.

Our society has changed faster, much faster, than the institutions that have traditionally been charged with changing that society. It makes it even more important for those of us who are interested and/or are advocates of technology and distant learning to not only try to move mountains but to also move battleships.

TERRY GIBSON:

Thank you very much, Ron. Let's go to our last panelist, Gary Meister. I'd like to thank Gary for substituting at the last moment for a panelist who could not attend. Gary is Human Resource Development Coordinator with AAA-Wisconsin. Gary has been acknowledged by his colleagues around the country in AAA for the innovative work that he has done in the applications of audio teleconferencing to the training function. I think it's very important that a conference on distance learning look at how the corporate world uses distance learning. The amount of money that the corporate world spends in training exceeds the amount of money that is spent on all of higher education by our public institutions. So they are a large and important field in the world of education and training.

GARY MEISTER:

I have some notes that I made downstairs when I learned I was going to do this. I titled it, "General Observations". This will be a little more impromptu and intuitive, non-academically researched, and straight from experience in the heartland. Some of these general observations have to do with trends in business as related to HRD (HRD meaning Human Resource Development) which is the current term for training or training and development. HRD was introduced when business realized that there is more to helping people learn about their jobs and learn about how to operate better in the workplace than training, which is a very behavioralistic approach to education.

First of all an assumption to operate on is that businesses are more and more operating in multiple locations. This is happening through mergers, through expansions, and through decentralization. There is also a continuing need to curtail costs, and part of this is accomplished, or a lot of this is accomplished, through streamlining and downsizing the number of employees. Those two don't seem like they go together, but they do because the expectation is that each employee does more with less.

With the increase in multiple locations, there is a great need for training and education. I have about four observations about training needs, with a couple of sub-comments under each one. One of the needs that continues to grow is the need for immediacy and timeliness of training and education and information. First of all for new employees, the need is for orientation. Getting a new employee started, providing essential skills and knowledge of

the job means having instructional materials and programs that are on site and can be implemented largely through self-guided and instructional programs. These programs can have the supervisor take the role of initiator and resource person. For current and on-going employees, the need focuses on changes in new directions, new products, new skills. There is also an increasing need for immediacy of information and intrepretation of that information so there is some consistency throughout those multiple locations about what the new information means.

For example three years ago AAA in Wisconsin had more locations than we have now, but orientation for new employees was done at the state headquarters in Madison. All the employees from all the other locations came to state headquarters for one day each month for the orientation, beginning skills and other training. Now three years later, we have a five-phase program on a national basis which includes not only orientation, but also customer service skills and development. It includes video and audio tape interaction with materials, written materials, and uses the immediate supervisors as resource persons. It's a broader, more in-depth program. It has much more in the way of skill development, and it's aimed not only at development of the individual but also at organizational change.

There's an old assumption that the way you do training and orientation programs is to bring everybody together at one place. We can't afford that anymore. In fact we've found out through using distance education techniques, technologies, and approaches that we can do a lot more for a lot less. Speaking of costs, it's always been assumed that the highest training and development cost is travel and meals. The traditional view of getting all the people together means paying their meals, lodging, and travel to go to a central location to carry out a one or two day education or training program. The cost as we have found as we have downsized and had fewer employees ends up being in downtime from the job. You can't have somebody on vacation and somebody sick and somebody out for training all at the same time. There's hardly anybody left in the shop when you do that. So we have to come up with ways of training people at the local location that can be implemented with as little disruption to work flow as possible.

Another recognition at the business level is that one shot workshops and programs don't provide the change and movement needed for individuals, departments, work teams or the organization. You need a long-range program with multiple contacts, reinforcements, and follow-up support for the transition to new skills and practices. One of the ways to accomplish that is through a multitude of materials, video support, teleconferencing, and any number of ways that we might approach learning at the local level.

Training as a behavioralistic approach is also becoming less prevalent. The change to Human Resource Development, for

example, emphasizes the idea that we deal with the individual and operate within a cultural environment, whatever the particular organization or work. The change to HRD also emphasizes that training needs to be supported with a more humanistic approach, a broader education approach, and a more creative approach. A broader approach is being applied even in areas of very specific skill training such as computer training. Those kinds of programs are being supplemented with more creative ways of using a computer or providing situations so that the individual can learn how to operate it more or less on their own through various kinds of distance education materials, approaches, and programs.

This all comes down to, as we term in the business world, the bottom line, which is the changing role of the educator in the business setting. The educators and trainers in a business setting, rather than taking part in stand up training, traditional classroom presentations, or one shot workshops, now have to spend more or most of their time in developing systems, materials, educating facilitators to implement programs, and initiating more broad-based methods and techniques to train and educate employees. What this means is that one of the reasons why business is getting into distance education is because of the need not to move people from one location to another. It is also economic driven and driven by the need for immediacy.

PRESENTATION NOTES

SATELLITE EDUCATION AND AN APPEAL FOR DEMOCRATIC REFORM

Jeff DeGraff
National Director, Communications and Education
Domino's Pizza Corporation

The aim of this talk is to create a critical perspective by which to examine satellite education within an entrepreneurial corporate framework. The guiding principle throughout this presentation will be the DeGraff principle - if it doesn't work, it doesn't matter.

WHERE ARE THE ENTREPRENEURS OF EDUCATION?

The Hope Report indicates that American business spent 455 billion dollars on education, 100 billion more than it spent on health care, to create a competently skilled workforce. We're not getting much help. Illiteracy is scandalously high, a common knowledge of basic principles of science is virtually non-existent, and my biggest gripe, MBAs are flooding the job market with the training to be the CEOs of very poorly run American megacorporations.

Folks, welcome to training hell. I can't get them next season; I've got to correct this situation NOW. Therefore, I have been forced into an entrepreneurial position - grow or die. At Domino's we've developed a curriculum that includes a mobile international satellite network for education because we need every tool available to overcome the handicap of a poorly prepared workforce - and we're talking pizza makers, not rocket scientists.

DOMINO'S EFFECT

These are the most envious of times because we are building like the pioneers of broadcast television. We have our boxing and are working our way toward Playhouse 90.

TV is an extension of an entire system of work; not vice versa. Communication must be operations driven; not marketing or "field" driven, but from and for the people who do the work. They are your business.

Domino's growth of 50% per year = mobilized education as a need not a philanthropic endeavor. Centralized channels of communication are imperative in a decentralized corporate structure.

Education is the center of our business - you can't buy a store, we give it to you; we teach how to think, not what to think.

No techies: technology is an extension of philosophy; hardware should never determine the who, what, where, when, and how of communication. But read any magazine on the subject and consider what

message media professionals are getting - bips, mips, pips are the meaningless folly of people who need to get real jobs.

Target: someone who will work five jobs in three years, including three promotions. Small business accounted for 85% of all new jobs in 1987.

Curriculum: education and communication with common focus and location.

Teachers teach: power to the people, locate the channel in the hands of your experts, the people who do the work.

The importance of looking real: a new grammar - the viewer in a work culture - the development of meaning - rough is good.

Television learning networks do not = corporate schools - appeal for reform - alternative accreditations.

Fast and effective channels of communication are imperative in a decentralized corporate structure - anyone with a franchise base will attest to this fact.

We are mobile: we go where the action is taking place.

Our business is built on a service guarantee: 30 minute delivery - the same with TV.

We rent the truck: an opportunity to recover down-time costs - this makes us more competitive than high profit companies because we are only trying to off-set costs, not create a positive cash situation. The bottom line: the network is not a financial burden on operations. That means our crew is on the road continuously - like SAC.

DEGRAFF'S TEN COMMANDMENTS FOR SATELLITE EDUCATION, OR HOW TO GET YOUR PIZZA MAKER TO WATCH

1. All communication is short-term education, and all education is short-term communication.
2. Teach people how to think, not what to think.
3. TV is operations driven - time, content, etc.
4. To believe Number 3, turn the operation of your network over to operational champions.
5. Your learners are your customers. If they're not getting what they need, you're out of business.
6. Have a sense of urgency - If not you, who? If not now, when?
7. Do more with less - Ockham's razor - if you can't think bottom line, you are the slave of those who can.
8. Quality product and service - the off button is your friend.
9. The most powerful networks have nothing to do with technology.
10. Tell the truth - if you lie you die.

Measuring the results:

Do we make better quality pizzas?
Do we deliver pizzas faster?
Do we make working fun, and is there an opportunity to work less and make more?

FIVE KEY INDICATORS TO DETERMINE IF YOU ARE READY FOR SATELLITE EDUCATION

1. Are you capable of thinking like a CEO and running a business? Support groups often expect special dispensation because of their role in the organization. However, whenever a support group takes on added debt, it takes away from the resources that can be returned to operations to manufacture better products, pay people more, and send folks home on time. If the cost, in terms of funds, time, and resources, does not return more than it takes from operations, a television network probably isn't right for your organization.

2. Will operations people set the agenda, times, and content material for your broadcasts? If the answer is no, that staff people will do this, what you will have is a very professionally produced program that distracts from its function and does nothing to support the big picture goals of your company.

3. Can you cover the action in your company? If the answer is yes, but only at the world headquarters or regional training sites, why spend the money on one more channel. Bring in your trainers and distribute videotapes. It's cheaper and easier.

4. Do divisions run your company? Does finance tell you what you can and can't buy? Will marketing and training fight over who controls the channel? You need champions to sanction any new project - this channel included. If no one will step up to the plate, forget it.

5. Can you become an advocate for operations at the risk of alienating the rest of the "corporate" staff? If not, you will be a success around the water fountain and a failure in the trenches where businesses are won and lost.

PRO'S OF SATELLITE EDUCATION

1. You can showcase how one operation achieves an innovation, efficiency, or opportunity. And when the viewer can call in and ask questions on how the situations were achieved. High interaction. Bringing your best to rest to help everyone climb the stairs.

2. You can create a uniform message by giving responses that can be seen and experienced simultaneously by everyone.

3. You can save the time of your operations people by reducing travel time, training time, and allow them the opportunity to turn you off if you're not helping.

4. You can continuously support your culture. How you do your thing is every bit as important as what your thing is.

5. You can add to your family - suppliers, customers, other companies, etc.

CON's OF SATELLITE EDUCATION

1. You cannot make an operation innovative, efficient, or entrepreneurial over the air. A viewer must participate in an operation to truely learn how it became great. Therefore, the network promotes learning about what is "out there" but the viewer must go "out there" to learn how to do it.

2. You cannot break down the reality gap between the executives and operations over the air. If poor communication exists in a company, you need to get people out in the operations to learn what's going on. Don't let people sell you on the idea that good communication is just a technology away. It will always be just around the corner.

3. You will not realize a significant reduction in travel time. If your network is working, it will increase it by demonstrating the need to visit operations.

4. If you have no positive company culture, you cannot create it with television images. Thank god folks in your operations are not that stupid.

5. If you don't give people tools that they can use, they won't watch. They will tell you that they are, but they are not. Congratulations you have just spent a million dollars on something that people have used their ingenuity and skills to avoid watching.

In short, you cannot replace human interaction with media interaction. Travel, mentoring, hands-on training, and shooting the breeze are still more effective methods of interaction than television.

1960s - cheap paperback books were going to stamp out illiteracy. They didn't.
1970s - computer assisted instruction was going to radically improve the math and science skills of our youth. It didn't.
1980s - satellite delivered training is going to help "retrain" the American work force to be more competitive on the world market. It won't.

It's almost humorous to hear the learning media organizations debate television's ability to teach. Division of the camps: (1) television doesn't teach, and (2) television can teach everything. Anyone whose three-year-old has a conniption in K-Mart to get a Smurf coloring book will tell you it's indeed a powerful tool. On the other hand, TV doesn't seem to help that same child understand how to tie shoe laces any faster. It's the same with grown-ups. TV is not going to solve your problems; your philosophy about problem solving tools will - Can people get what they want when they need it? That's your goal. That's where TV can help.

Furthermore, the friendly facism that is often the propagandistic benchmark of coporate communications is quickly uncovered by this interactive medium - if you try to coalesce your viewers with slick images and slogans, they will see all too well what you are doing; and the impact, in toto, on your network will be retrograde communication.

In conclusion, I believe the key to creating an effective television network is in developing a "people's network" - an electronic democracy where meaning has common dimensions and tools are shared.

THE ANNENBERG/CPB PROJECT: A MIDCOURSE PERSPECTIVE

Hilda Moskowitz, Ph.D.
Senior Project Officer
The Annenberg/CPB Project

Good afternoon ladies and gentlemen and fellow colleagues. My place on the program of this conference gives me the pleasure of continuing the conversation you began yesterday on the enterprise in which we are all engaged--the enterprise of making the experience of distance education even better and even richer--for those who learn and those who teach.

Today I will be talking to you about what the Annenberg/CPB Project has been doing since it was established in 1981, and pointing to likely directions for its work in the next five or so years. During the course of my talk I also will be highlighting topics of particular mutual interest about distant learning and touching on issues that we at the Project think about regularly.

But first, a little background may be helpful. The Annenberg/CPB Project was established in 1981 with a gift of $150 million to the Corporation for Public Broadcasting from The Annenberg School of Communications. Its purpose is to provide increased access to high-quality college-level education using the telecommunications technologies to improve the quality of the educational experience.

First and foremost, the Project seeks to improve opportunities for distant learners pursuing a baccalaureate education. Along the way, the Project also has the opportunity to improve educational experiences for informal learners and on-campus students, and make available more diverse resources for faculty.

Now for some numbers about what the Project has been doing. Since 1981 the Project has committed approximately $75 million to some 60 projects. The first complete television- and audio-based courses became available for use by colleges and universities in 1984. As a collection, the courses now available include 18 semesters in the Humanities, 13 in the Social Sciences and 10 in Mathematics and Natural Sciences. In addition, there are 13 projects that demonstrate new applications of the technologies for higher education. And the list grows every year.

Before I go on to assess what this list represents for distant learning, let's pause for a moment to consider the environment in which the Project's activities are taking place. First, we know that during the 1980s and even before, there has been a steady growth in the number of non-traditional adult learners. They enroll at colleges and universities because they recognize the increasing value of life-long learning as a means toward upgrading or changing careers and shaping the quality of their lives. And when offered the opportunity, many of these non-traditional learners opt for the mode of distant learning because of its convenience and flexibility.

Secondly, colleges and universities have responded by trying to meet the needs of these adult learners, albeit a bit slowly at first. The institutions have seen the shift in demographic patterns, and, with it, new combinations of satellite centers, weekend colleges and media-based course programs, among other models, have been established.

Thirdly, and most recently, with the accelerating pace of technological change, colleges and universities are revamping their campus telecommunications systems markedly to keep abreast of new configurations for phone and data transmission. At the same time, lower costs and enthusiasm for the versatility of new equipment has increased the personal ownership of VCRs, the appearance of computers in offices and homes, and brought cable video into more than half of the nation's homes.

How then, does the Annenberg/CPB Project's activities fit within this environment in which the distant learning experience currently is nurtured? To begin with, the Project sees itself as a partner--a partner of colleges and universities, administrators, faculty and students. We fund the development of projects. In turn, institutions, administrators and faculty assess the value of these developed resources for their individual constituencies and learning settings. They make decisions about adopting or adapting them. And finally, once resources are available at colleges, students make decisions about enrolling and using them.

Since we at the Project do see ourselves as partners, how do the Project's decisions reflect that role? Early in the Project's history a determination was made to concentrate on making learning opportunities accessible, and on striving to provide rigorous, high quality educational experiences for distant learners.

The Project has pursued two paths toward this combined goal--with the two paths often converging. One, projects are funded that will provide a greater range of course options and resources for distant learners using video and audio as a core component. Two, projects are funded, often using the newer computer technologies, that provide more intimate access to learning than was possible at a distance before.

Let's look more closely at some examples of how these projects support the twin standards of accessibility and quality integral to an excellent distant learning experience. The intention behind the Project's collection of courses is to develop useful and rigorous credit-worthy courses in three principal areas--Humanities, Social Science and Mathematics and Natural Sciences--and in a large number of disciplines. History, archaeology, foreign language, composition, art history, philosophy, area studies, economics, political science, psychology, sociology, computer literacy, chemistry, mathematics, physics, geophysics and environmental studies are represented by available or soon to be available projects.

Courses have been developed in a broad range of liberal arts disciplines with a distinct purpose in mind. That purpose is to enable colleges to offer more course options to distant learners who are seeking to meet the general education requirements for a degree. In some cases, courses have been chosen for development that students might even have trouble finding in a distant learning mode--such as physics, where the two-semester course called THE MECHANICAL UNIVERSE is now available, or French, where an introductory language sequence,

FRENCH IN ACTION, also is now available. In all instances, the courses chosen for development offered the potential for truly excellent pedagogy.

Initially, it was proposed that these courses would be available for students to see and hear over the broadcast media. Colleges would adopt the television-based courses, paying a license fee, with college distribution managed through the PBS Adult Learning Service, one of the Project's distribution partners. That avenue of public broadcast delivery remains a central feature for use of the television-based courses. However, one could not have predicted back in 1981, or even in 1984, how quickly even greater flexibility and control by individual students would become a reality.

With the majority of homes across the nation now wired for cable, the Project is working to build increased distribution with more repeat airings through various cable outlets. For some years the Project's courses have been aired by The Learning Channel which reaches eleven million homes and carries five of the Project's courses in a typical semester during day and evening hours. Even more dramatic has been the growth in ownership of VCRs and of audiocassette players. In a recent survey of students taking Annenberg/CPB courses, fully 80% owned VCRs and we know that virtually everyone has immediate access to the ubiquitous audiocassette player in their homes and automobiles. The steady increase of these kinds of equipment has made it more convenient for students to tailor their learning schedules to fit busy timetables.

In addition to providing diversity in course options for rounding out degree requirements, the Project also seeks to develop courses that establish a new standard for educational quality in the way particularly difficult subjects are taught. Here we saw the possibility of using media not only to motivate the student but to help shape understanding of concepts in a way that cannot be done as readily in a classroom-based environment. For example, the animated graphs and charts used in ECONOMICS U$A and in the math course, FOR ALL PRACTICAL PURPOSES, help make abstract relationships and dynamic patterns believable, putting them within the intellectual grasp of more students. Learners who fear approaching concepts in physics or techniques used in poetry, now are offered more visual analyses which coordinate with explanations in the print materials, in THE MECHANICAL UNIVERSE and in the American poetry course, VOICES & VISIONS. Learning a foreign language becomes less formidable because it is approached as a true communication experience built on immersing the student in an alternative cultural environment. Grammatical concepts still have to be mastered, but their function becomes more understandable through the complex of components that make up FRENCH IN ACTION.

Ideas which are principally abstract also take intellectual shape in student's minds when they hear them expressed in alternative ways by scholars highlighting certain facets of an idea. The audio programs of the audio-print courses lend themselves especially well to this approach, on topics about marriage and the family and the pervasive themes in English and American literature, for example. In essence, what the Project believes these media-based courses can transmit, is a greater immediacy of intellectual content by skillful use of the visual and the auditory to support ideas central to the

course and the accompanying print materials.

When we turn to the second path, with projects that demonstrate new mixes of the technologies, the Project anticipates that those activities will provide us with testing opportunities for enhancing interactive experiences for distant learners.

For example, the University Tech-Tel Project makes it possible for students who are scattered geographically to participate in a real time or synchronous conversation and to share visual images and text that appear on all of their computer equipment at the same time. This combined voice and data transfer system is being used by The Harvard Extension program to teach calculus. All of the students can see a graph, problem or model changing on their screens, can communicate with each other by phone and pointing on the screen simultaneously, and, therefore, all are able to contribute during the problem-solving process. This creates learning opportunities that go beyond what is typically possible for the student in the classroom.

The New Jersey Institute of Technology Project, known as NJIT for short, is tackling yet another issue for distant learners. Sometimes participating during real time is not possible or convenient. NJIT has expanded its computer conferencing system that enables students to participate in a delayed time mode, called asynchronous conferencing. The tools for the system shaped by NJIT help to sort information and allow for transmitting of graphic images as well. Both the University Tech-Tel and NJIT projects are striving to overcome geographic and time barriers.

The Brown Intermedia project works to build interaction within the student's own thinking process. Intermedia uses the technique of hypertext to encourage students to make connections among diverse concepts and information. Typically, ideas are conveyed in a linear sequence to students, both by print and by faculty who are lecturing. The Intermedia project gives students a dense web of ideas and data to work with, and also offers them a variety of ways to design their own sets of connections among those ideas.

The PERSEUS project relies on a similar structural foundation. PERSEUS is developing a series of compact and laser discs that would contain a representative collection of salient material, both text and visual images, for studying about the classical Greek era, both in English and in Greek. With these discs, that might be sold for as little as $50, there could be a profound effect on the teaching of classics, regardless of the student's location. As with the video-based projects, the principles of visualizing material and making connections play critical roles in both the Intermedia and the PERSEUS projects. The advent of HyperCard, a software tool that makes it convenient for individual faculty to create stacks of related materials, has made it possible to develop projects such as PERSEUS and Intermedia far more quickly than in the past.

In fact, what we are seeing with these projects and generally throughout higher education, is a shift away from use of the computer for drill and practice exercises, to new applications that tap the power of the computer in ways that far exceed what could have been dreamt of five or ten years ago. These demonstration projects are focused on placing more versatile tools in the hands of students and faculty, who then can tailor them to provide a better match for individual students and courses.

With these projects--both the media-based courses and the demonstration projects--moving forward at an encouraging pace, the Project has also recognized the importance of making it possible to obtain these resources conveniently and affordably. After all, letting colleges and faculty know about them and determining how they work with their students is central to our goal. Here too, changes over the past few years have opened up more varied possibilities. The Project, through Intellimation, another of its distribution partners, has reduced the cost for purchase of a one hour VHS videocassette program to under $30. A typical course with thirteen hours of video, such as THE CONSTITUTION: THAT DELICATE BALANCE, is now available for $350 for the video. This marked reduction in price puts it within the realm of purchase for individual departments and even some faculty members.

For the audiocassettes, purchasers who buy the audio component of a course for under $30, now can duplicate as many sets as they wish, for most courses; in this way providing a low-cost method to place sets of the audio in the hands of each distant learner. We also have worked to simplify the process for obtaining these materials. The 1-800 LEARNER phone number, which is based at Intellimation, handles orders for video and audio and many of the print materials, and ships to faculty, students, libraries and other interested parties.

Development of these resources for distant learning and their use by institutions, faculty and students is a major part of the Project's activities. Yet it has been clear that these resources are one element in a total learning environment. Looking at the broader picture, the Project is concerned about the general state of health of distance learning as a respected educational enterprise. It is important to build greater credibility for this mode of education, which is sometimes treated as second-class.

One way to cast a more accurate and favorable light on distance learning is for the Annenberg/CPB Project itself to adhere to a high standard for developing quality resources. We are committed to that rigor and that reputation is becoming better known. Another way to solidify the practice of distant learning was to help launch a refereed journal to provide a vehicle for sharing thoughtful perspectives on the subject. That publication, called THE AMERICAN JOURNAL OF DISTANCE EDUCATION, is based at Penn State University with Michael Moore as its editor. It is now entering its second year of publication.

Closely linked with the forum provided by the JOURNAL is the need that is being felt to establish a research agenda to address distant learning questions in a more systematic way. Recently, the Project funded a symposium at Penn State University for the purpose of formulating a research agenda and identifying major questions that face our profession. A report on that symposium will be published early in 1989.

In addition to encouraging research by others, the Project has also commissioned a range of research studies to provide educators with a solid base of data about the students, learning approaches and uses of the resources. Especially valuable evaluation studies also will grow out of the activities undertaken by each of the technology demonstration projects, with a few available at this time.

Having summarized what the Project has been doing up to this

time,let's turn now to consider what the future holds for the Annenberg/CPB Project. Bear in mind the dramatic changes that have taken place since 1981 when the Project was established, and try to imagine the educational and technological environment in another seven years. It's virtually impossible to do, yet we all have to think and plan for the future based on current analysis and some attempts at clairvoyance.

Looking at the path involving the course collection, we anticipate completion of more courses and funding for development of new ones, as well. The next two years, for example, are particularly rich ones, with the completion of eight new video-based courses and six new audio-print courses.

I will run through these quickly for you. This fall, three audio-print courses--ETHICS IN BUSINESS, AMERICAN NATIONAL GOVERNMENT and INTRODUCTION TO ENGLISH AND AMERICAN LITERATURE II: THE 20th CENTURY--will be ready. They will be joined in the winter of 1989 by PRINCIPLES OF STATISTICS, BASIC CONCEPTS IN MUSIC and NUTRITION. For the video-based courses, ETHICS IN AMERICA, a philosophy course about ethics in the professions, and WAR AND PEACE IN THE NUCLEAR AGE, a history and international relations course, will both air on public broadcasting stations in January.

Fall 1989 will bring the premiere of THE HISTORY OF WESTERN ART, and a course on life-span psychology, called SEASONS OF LIFE, together with an introduction to data analysis, called, appropriately enough, AGAINST ALL ODDS. Also in fall 1989 the first semester of a year-long course on the history of western civilization from ancient times to the present will also become available. And on into 1990, when an introductory psychology course will air as well as a new course on environmental studies, called STATE OF THE WORLD.

When we turn to the path to be taken by projects using the computer technologies, its course is less predictable. The horizon cannot even be glimpsed yet. Each month brings news of fresh advances and designs, with ramifications for educational application. I can say quite honestly that the Project staff continues to be amazed and astonished at the fertile ideas submitted in the way of applications requesting Project support and pleased with the dedication they reflect to distant learning.

In the future the Project also wants to increase activities that will make its resources even more accessible. These activities include broader video coverage by cable and continued support of a network of colleges that we have organized. This network of colleges makes possible credit to distant learners when a local college is not offering a video-based course. Beginning with five colleges, the network now includes eight participating institutions.

It is also important to make information about existing software resources easier to come by. For this purpose support is planned for organizing and indexing collections of software useful for educators. We have also completed an update of the Telecourse Inventory and hope to have it printed this Fall.

Research activities will continue as well that should provide data about distant learners, the variations in modes of teaching and learning, uncovering how the Project's resources are being used, and addressing some of the key issues emerging from the distant learning research agenda.

In another direction, a major initiative is underway to find a home for the Project's audio and video-based course materials in the growing media collections of public libraries. This would be of real value to distant learners who rely on their public libraries as a principal resource. We are also working to encourage partnerships between some colleges and public libraries where that arrangement would help support distant learning. From another perspective, the public library is a vast national arena for reaching informal learners. By placing the course resources within the grasp of informal learners through library loans, a wealth of self-directed learning experiences becomes possible. Again, what makes this public library initiative feasible is the affordable pricing of the video and audio components, well within the parameters of many public library budgets.

The Project's principal audience is the distant learning population. Yet as the Project has pursued its activities, other interesting spin-offs have presented themselves, which have expanded the uses of its resources. In-service teachers have taken adaptations of the economics and physics courses as a means toward improving their own classroom instruction. We look forward to extending use of other courses in a similar way, where appropriate. Upcoming courses in environmental studies and chemistry seem promising for this purpose.

Similarly, high school adaptations and modules have been developed with National Science Foundation funding for THE MECHANICAL UNIVERSE physics course and FOR ALL PRACTICAL PURPOSES, the math course, with funding also secured for high school adaptations for the chemistry course in the near future. Yet another population, the membership of the American Association of Retired Persons (AARP). is using portions of the programs of THE CONSTITUTION: THAT DELICATE BALANCE as a discussion resource with an accompanying discussion guide. All of these examples evolved, one by one, as people thought creatively about extending the application of a fertile set of resources designed to meet a high standard of quality.

At this stage in the Project's history the staff is also taking time to reflect on what has been accomplished, what is underway, and considering approaches for the future. We are engaged in an intensive staff planning process that includes questioning and refining Project activities. As our partners in the distant learning enterprise, with you who are here today closest to guiding students and adapting the educational system to meet their needs, we look to you for creative directions for the future. I welcome this opportunity to talk with you about the Project, and to hear from you about our work and yours.

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4th Annual Conference on Teaching At A Distance
Keynote: Future Directions In Distance Education

George Hall
Director, Office of New Technology Initiatives
Public Broadcasting Service

I'm delighted to be here in Madison. Wisconsin, of course, is a special place not only for continuing education but for that important institution connected with continuing education - public broadcasting or public telecommunications. Public broadcasting began in this country here in Madison at WHA radio. We've had a great many important ideas and talented people come into this field from Wisconsin. Of course talented people have come from elsewhere in the country as well, but I think all of us who come to Madison need to remind ourselves that this is something of the center, the epicenter, of a very important institution called public telecommunications, which will carry continuing education and formal education to new levels of service and achievement in the years to come.

People who work in public telecommunications and continuing education are by disposition not patient. You are not impatient, you're unpatient. You're not willing to put up with the frustrations, limitations and difficulties of education any longer than you absolutely have to. You'll make use of existing techniques, old worn out ones where needed, but you're always pushing to get something new going. It's that unpatience that characterizes those who work in this field that is going to make an enormous difference. I'm going to be talking about some technological gee-wizardry. It's about this kind of gee-wizardry that you will all have a certain level of unpatience. You want to get things moving, to overcome some of the problems we have.

As you know, people outside of our own field are very prone to think that we have arrived at a peak in technological development, especially in the telecommunications area. We have an abundance of televisions, radios, satellites, fiber optic cables, video disks, micro computers, and the list goes on and on. What else could we want? A complaint is often heard from the political community and elsewhere. Oh, if we only knew how to use these tools. There's probably some truth to that, but I think that's not the important way to look at the inventory of modern technical miracles around us. As wonderful as they appear to be, they in fact, are still very limited. That may even surprise some of you. Let me just give you a couple of examples.

I went to a meeting in Chicago yesterday. At the beginning of the meeting, the chairman said, now will you please look at the memorandum that I sent you which is going to be the basis of the discussion. Well, of course, I hadn't brought the memorandum

that he had sent me. It was on my desk at PBS. So somebody had to go and get it out of the word processor and print it.
Let me give a more complicated example. I bought a CD, one of those wonderful audio recordings of an opera by an Italian named Monteverdi. I'm an opera nut, but I didn't know much about this particular opera. I could find nothing in my own library, which is fairly extensive, about this work. So I went to the public library which represented a trip of a half hour. The public library had very little more. I tried to get to the university library, but it was closed at the hour I went. I could have gone to the Library of Congress in Washington, had I been willing to put in 90 minutes filling out forms to get permission to go in. In short, my interest in continuing education was frustrating because I knew that there was an enormous amount of information about Monteverdi, that opera, the poem on which it was based, and the music of that period. I could get to very little of it. Why? Because as marvelous as our information institutions are, we haven't yet developed technologically or otherwise the linkages that will put all of it together.

We have technologies that link people. We have ways of linking people and information, but we don't have ways of linking information and information very easily. So when I looked up Monteverdi, for example, I just got a thumbnail sketch. I might have gotten a bibliography, but I didn't have access through that piece of information to other information. You get the point? But we are entering a period, as you may know, sometimes called hypertext or hypermedia, when all of that is going to change. Because of the work being done in telecommunications, it's all going to begin to fit together so that we don't have the frustrations of not having information where we need it, when we need it, and in a form in which we can use it most practically.

Think back to the beginning of the human experience, way back before we were born. Our ancestors in some distant village had learned to communicate by making words and gestures. They were pretty good at it. They had even learned to beat rhythm with a stick, maybe whistle through a reed, and they developed a symbol system we might call music that added meaning beyond the capacities of the human body itself. But there were two problems they faced. One was getting information through time. The wise people of the village learned a lot about the agricultural process, about food supply, about the weather. How could they be sure that such useful information could be passed to the next generation. All they could do was tell the next generation, right?

You've all played the parlor game where you take a specific piece of information, type it on a card and hand it to one person. You tear up the card and the person tells the next person who tells the next person, right around the group. You know what comes out is usually very different from what went in. That was the trouble with oral transmission. Going from generation to generation resulted in enormous distortion. If there was some

way, our ancestors thought, that they could develop a technique to transmit information accurately. Well, of course, they invented pictures and writing. Because writing can be preserved, you can pass information along through enormous numbers of years. It was a tremendous leap forward, this conquering of time, managing of time with mediation.

There was another problem, however, and that was space. People wanted to find some way to communicate over distances. We developed drums, and smoke signals, and things; but they didn't go very far. Then about a hundred years ago, for the first time, we began to see an enormous number of breakthroughs. Not only could we communicate through time with books and other time management devices, we could communicate over space with telegraphs, telephones, satellites, and much faster communications forms.

The information age is here. We have so much information we can hardly use it all. However, we are not yet able to access it easily. What we have done, out of necessity, is build many different vertical informational institutions: radio, TV, books, and so on. They are divided into individual libraries, individual publishing companies, individual TV networks and so on. We can move around among them, but with some difficulty, as you certainly know. Let's say you're watching the nightly news, and there's a story about some remote port on the western shores of Saudi Arabia and you're interested in that. You can go look in your encyclopedia and you'll probably find a little bit, but you won't be able to pursue it very far unless your collection is an unusual one. If you did as I did with the opera, get into the car and go to the public library in Madison, you may find a little bit more. If you're lucky you might be able to go to the University of Wisconsin and get more. But you're going to have to spend a lot of time and energy to do that. Wouldn't it be nice if you could push a button or say a word at the moment you want that information and it could be linked to you from wherever it needs to come. It is perfectly possible. We can do those things now with satellites and telecommunications. But we haven't developed a system that links it all together, that makes things available where we need them and when we need them.

Let's talk about some of the technologies that are now becoming available that will impact on this problem in the next ten to twenty years, impact in a radical and important way. We have satellites. Satellites now make it possible for broadcast programs and telephone conversations and data streams to go around the world almost instantaneously. Let's look at another technology called ISDN; Integrated Services Digital Network. It's a technical term. It really means, when you cut through all the engineering talk, the use of fiber optic cables to transmit electronic materials in vast quantities. Millions of telephone conversations, enormous numbers of video and audio programs, great numbers of data streams transmitted via the same cable, changing the profile between the different media as the traffic-

demands require. With the old technology, we didn't have that convenience. In the past we had so much cable devoted to telephone conversations, so much to video, so much to data, and if we underused, we wasted it; if we overused we couldn't transmit because of the glut. Under ISDN that kind of problem will disappear and we'll have enormous transmission capacities between cities and to individual residences, schools, and offices.

Let's imagine we are ten years from now. My friend Bob from Macomb, Illinois, is in the audience, and suppose Bob develops a raging passion for the films of Carol Lombard. Now, in Macomb, let's suppose the supply of video cassettes of Carol is very limited. Bob goes home one afternoon on the weekend and says I would really love to see a good Carol Lombard movie. He could go to the library and try to get a catalog, or a whole batch of catalogs, and order things through the mail. But let's assume we've got more linkages in 1998 than we have now, as in fact we will have. Bob sits down at what I'll call his terminal which is a computer, video screen, and audio access device. By speaking words or using the keyboard or both, Bob asks for a list of Carol Lombard movies. In no time at all, he has a catalog on the screen. He discovers that the Carol Lombard Memorial Film library is at the University of Southern California in Los Angeles. By encoding a few more commands into his terminal, he can order a film. It will not be delivered by Federal Express or the US Mail. He will get it over an ISDN. Out in California there is a stored version of that film; not in the form of a film, or even a video cassette as we know it now, and not even a video disk as we know it now. It will be stored with some rather miraculous attributes.

If you've ever looked at a film or television program in an editing device, you know it's broken into frames. If you turn the frames one by one through the device, there is virtually no change between individual frames. Hundreds will go by in which there is no perceptible change. Now that wastes a lot of film, and electronics, and bits, and bytes so they won't do that ten years from now. When they store the material, there will be a computer that will read that original film and it will say to itself (computers, of course, do talk to themselves) look at frame number 27,513; that scene is replicated for 1,012 frames. I'm not going to replicate it. I'm going to leave a message to myself, to take this one frame, print it, and then when it's played back, play it back that many times.

The computer is even more marvelous than I am describing because it can look at a frame and it can detect the tiniest difference between one frame and another in some particular picture element or dot on the screen. It can say to itself, there is no reason to change all of the dots making the picture, just change the few dots which would change between this frame and the previous one. Make a note of those dots and just send those dots. Tell the reconstructing instrument, put back all the dots you had in the

previous frame except change these few in this particular part of this frame. Get the picture? You've taken a 90 minute movie and you've compressed it immediately into a very much smaller electronic space. Now it is equivalent to about five to seven minutes, you've done so much compression. You can even compress the speech. You've got a scratchy soundtrack and the computer can analyze and pull out the essential sounds and record those in much less band width than is required in an ordinary audio recorder. There will be a little note kept off to the side that says when you reconstruct this, you have to add some overtones and harmonics to make this voice sound like Carol Lombard and that voice sound like Clark Gable.

The movie that Bob wanted is now a tiny electronic package out in California and he wants it sent to him in Macomb. He could have it sent right at the time he wanted to look at it, but he's willing to wait until 8:00 p.m.. Since he called at 1:00, shortly after 1:00, this little package coming out in bits and bytes will begin its trip to Macomb, Illinois. It may go up to Spokane and the first few seconds of it will stay there in a big kind of electronic buffer and then it will move on to Missoula, Montana and into Bismark, North Dakota and into Chicago and down to Macomb. Then the next part may be directed by the ISDN through Phoenix, Laredo, and Memphis. Slowly, but surely, the Carol Lombard movie will be assembled in his terminal. If he wants to record it, he can push a little button and it will be imprinted on something like a video disk, or in a video cube, or maybe even on an old-fashioned video tape. The telemetry in the system will automatically record that fact and will see that the computer out in California sends him an appropriate bill.

The movie may be a silly example but you can imagine in continuing education, how technology could work in getting material to people who need it - from wherever they are located. You will have to pay and you will have to get permission sometimes, but information will come to you. Because of the work people in public broadcasting are doing, they are going to link people and information together. They are going to see that the encoding is different so that materials will travel electronically. They can come out at your end as paper if you want, or they can come out in the form of an electronic book.

You may have heard the name Alan Kaye. A remarkable man, a genius who works for Xerox. He is in the process of developing what he calls a dynamic book. Now a dynamic book will be about the size of a notepad. It will be made out of plastic or something similar. There won't be any wires coming out of it. It's a book that you can walk around with in the classroom or at home. It picks up very complex signals, from what we will call for lack of a better term, a laser field that's being fed from your "terminal" that's hooked into the ISDN. This dynamic book is like a computer except that anything you wish can be displayed on the screen - t[illegible] pages from the Manhattan phone book, a piece of art from the Chicago Institute, a mathematical problem from a

textbook, a Carol Lombard film, whatever you want. Along the side will probably be some pressure points or maybe a microphone in which you can quickly encode your wishes. Now, the real processing for the book isn't taking place in the book; it's at the terminal connected into the larger whirl. The signals are going back and forth and opening the appropriate gates to get the information you want into your dynamic book.

There are some other miracles that are coming that will make it even better. Suppose you look up Monteverdi, and discover that the best information on the subject, is at the University of Bologna in Italy. Well, if you're like me, your Italian is not enough to get you by. What are you going to do? What good will it do to have that information brought in by satellite and put into your dynamic book? It's Italian and you can't read or speak Italian. You will push a button that will automatically translate it. That can be done now at the laboratory, it'll be done with facilities in ten to fifteen years, and very cheaply. With chips, you just push a button for a translation.

But there's a miracle beyond this! Suppose the Italian translation uses concepts and terms, frames of reference beyond my educational level. I can push a button to lower or raise the readability level at will. You will be able to change the level of comprehension to make the material useful to your purpose. As you learn more about the material, you can consciously raise the readability level again. But there's something even more miraculous. You may not have to tell the device to make itself more sophisticated. There's something called artificial intelligence which works quite well out of the laboratory. You will have artificial intelligence chips in your dynamic book or in your terminal that controls the dynamic book. As you show a capacity to use the new information at higher levels of sophistication, the artificial intelligence chip will be reading your changed behavior. It will automatically adjust the reading level to your capacity. It will note the kind of responses you make because material will be strongly interactive. If you show the capacity to use the more sophisticated terminology, it will automatically release that terminology to your system.

Some of these technologies will come more slowly than others, and some will take a different form than I have described because I have done so with a kind of comic book simplicity. But all of these things are in fact underway. All will have one surpassing characteristic - connectivity, linkage; what the specialists call hypertext. Hypertext is a term that was invented by a man named Ted Nelson who came up with the idea that information systems we have now are awkward, filled with barriers and problems. He wants to pull down the barriers between the vertical columns of public broadcasting, public radio, the commercial press, Sunday newspapers and so on. He wants us to have all of these things connected together so we can move, effortlessly almost, from one to another. That kind of linkage will mean the space management we have built into many of our media - the ability to move

information through time - will be joined by space management that will allow us to link things over long distances and with great ease, at low cost, and at the point and place of use. By providing access to the great libraries, the great art collections, technology will induce a spirit and operational capacity for equity which goes far beyond anything we have been able to imagine.

Some of you will work in vertical columns. You will continue to develop knowledge and organize it in these vertical columns to be sure that the knowledge is there for the next generation and for the users in our current generation. But others who are concerned with telecommunications will be particularly concerned with making linkages to be sure that the people who need the information can get it when they want to in a form that's usable. It's an almost new profession, isn't it. We have been so intense on creating vertical columns, and with great success, that we almost tended to forget that we need to make all of that accessable, to connect people to people, people to information, information to information, people to place, place to information. You see the geometry of a very complicated structure that arises.

It's interesting that we live in this time because if you think about it, hundreds and hundreds of years have passed with very little progress in this direction. All of a sudden in the last hundred years we have begun to gallop and we've reached a point of increasing achievement that will continue not only in this country but in Japan, Europe, in other countries of the world. The kinds of developments which make all of this possible are occurring at great rapidity. And you in your particular field, more than any people I can think of, unpatiently will want to be able to bring these capacities to bear on your problems. You're already accepting of the fact that learning is distant. It's distant and close in a sense all at once. It's distant because if you measured by miles the distance it would be impressive. But it's close in a sense that it doesn't really matter where the information comes from.

I realize there will be limits. Some things won't be available, there will be people who will hoard information. Some information will cost too much, some will be suppressed, some will be filled with error. But there will be this linkage and this flow that goes beyond anything that we've known and that's what is meant by hypertext. It's something that is operating at a hyper level, a super level, having an abundance that goes beyond anything we've known in the past.

We will have some blunders along the way, but you do live at the beginning of an age of miracles. You are in a profession in which what you do will be deeply involved with the miracles, because you are unpatient and you want the miracles to let you do what you do best more efficiently and more aggressively than ever before.

4th Annual Conference on Teaching at a Distance
Madison, Wisconsin, August 2-4, 1988

Introduction of the Charles A. Wedemeyer Award

by Michael Moore

It is a pleasure to introduce the recipient of the Charles A. Wedemeyer Award, which is presented by The American Journal of Distance Education and the University of Wisconsin-Madison, Department of Continuing and Vocational Education, for an outstanding article published in the Journal this past year.

In 1985, at the conclusion of the opening address of the very first Conference on Teaching at a Distance in Madison, I reminded the audience of an event that had occurred exactly 21 years before. That was a conference of the Articulated Instructional Media Project, almost certainly the first attempt to bring together in one place educators, engineers, anthropologists, psychologists, and media specialists with the intention of conceiving and implementing a multi-disciplinary approach to the provision of instruction to learners who were separated in space and/or time from their teachers.

As most of you know, the genius behind that conference was the visionary who conceived the AIM project, Professor Charles A. Wedemeyer. At the 1985 Conference I quoted from his report on the AIM project, which was the experimental prototype for distance education as we know it today: "We can identify the chief advantages and strengths of all the varied methods, formats, programs and the media which provide extension or outreach opportunity. By rejecting the idea of teaching only within a single discrete method, we can create a sequence of articulated learning experiences that will give each student more intelligent choices and chances and will carry him further towards his goals. Our articulated approach to learning enables us to use each method, medium or format for that type of learning activity in which it offers superior results."

"By rejecting the idea of teaching only within a single discrete method," we can give the student more choices and more chances. In that statement lies the key to understanding the revolution that is occurring in education today. It is an idea that only a minority of educators have yet come to appreciate. To implement this idea is the key to the development of education into the next century. The solution of our educational problems does not lie in correspondence or independent study alone; it never did. Nor does it lie in television or the personal computer, or with the latest medium of excitement, the satellite. Furthermore, more than a century of trial and failure (along with successes) has proven that face-to-face methods also do not give ALL our students enough "intelligent choices and chances." Whatever name we give the emerging approach, the solution to our educational problems lies, in part at least, in what Wedemeyer called the articulation of methods so that each is used "for the type of activity in which it offers superior results."

Of all media one of the most valuable, because it is the medium around which almost all others can most effectively be organized, is the printed study guide; and while its role in new multi-media systems will be critically important, at present it is still underestimated and badly neglected.

In her article "Independent Study in Higher Education: A Captive of Legendary Resilience?" Becky Duning has identified and drawn the attention of American distance educators to the critically significant challenge of integrating traditional independent study with evolving distance education.

It is because the issue is of such importance that her article has been selected for the 1987-88 Charles A. Wedemeyer Award for an outstanding article in The American Journal of Distance Education.

Becky Duning is currently Program Manager for Teleconferencing and Special Non-Credit Seminars in the Division of Continuing Education at the University of Colorado at Boulder.

Many of you may not know that Charles Wedemeyer pioneered the use of telecommunications for education--including the use of the satellite--here in Madison. You will know he was Director of Independent Study. I have told you of his belief in media articulation. As Becky's article was considered for the Wedemeyer Award, these and other lines of convergence became more numerous and more apparent. Perhaps it is more than coincidental that Becky shares with Wedemeyer a noticeable intellectual boldness and bravery.

There is, of course, the difference of age. And yet in considering Becky as recipient of this award, it was also felt that it would give pleasure to Professor Wedemeyer, the father of our field of distance education, to give recognition and encouragement to one of the field's younger and emerging leaders.

For these reasons, therefore, it gives me pleasure to present Ms. Becky Duning to receive the Wedemeyer Award, and to invite Professor Wedemeyer to present her with this certificate of the award. We then invite her to speak on the subject, "Correspondence Study and the New Media."

Charles A. Wedemeyer Award Recipient

"Correspondence Study and the New Media"

Becky Duning

To receive an award in the name of Charles Wedemeyer, and to have the award actually presented by Charles Wedemeyer himself, induces a bit of reflection about what one would like to say in response. It occurred to me that to re-read some of Wedemeyer's thinking would be useful. I found what I was looking for in an interview with him published in The American Journal of Distance Education last year. The last statement reads, "I have never before seen such tremendous possibilities for growth in so many different directions."

We in this room, so many of us involved not only in distance education but in telecommunications applications to education, might well count ourselves lucky. All of the predictions about the future are running in our favor. Five years ago in an article published by the American Association of Higher Education, the writer[1] said: "...this is not really a prediction but a guarantee--those who...accept the new technologies...will be more successful, will have better incomes...will get more rewards, and, most significantly, will have more power than those who do not."

More recently, another observer[2] wrote, "...people who do not... participate in the new knowledge environment will be the peasants of the information society...and, the societies that do not ensure that this participation takes place "will be left in the jetstream of history by those who do."

Could we ask for anything more? To be the right people at the right place and the right time, and even be recognized for it in our own lifetime? Lest we be carried away with euphoria, and there are, in fact, grounds to feel that we are riding the crest of lots of trends that are going our way, I want to consider three barriers that we must overcome if we are to realize the expectations of a Charles Wedemeyer.

The first barrier is what might be called "incubation time." Let's use something as simple as the printed page as an example. Paper was invented by the Chinese in AD 105. No one formed an entire page of text until the 10th Century, that is, for 900 years. It was another 500 years before we had the printing press--14 centuries after the invention of paper. Incubation time is real; we can't seem to skip steps, though we can contract them by seeing what matters, what deserves our energy, and what doesn't. I'll be returning to the "what doesn't" shortly.

The second barrier can be illustrated by a true story. An administrator was speaking with a group of deans and department heads about introducing a change that would affect faculty. One of the deans spoke: "I'm sure this will work well in practice but how does it sound in theory?" This reflects an attitude barrier implicit in the working context of post-secondary

education institutions and organizations. We work within strongly theoretical missions and articulated institutional agendas. These agendas need not be millstones around our necks, but there must be a link between us and those agendas. The development of that link is very much in our hands, and is very much our responsibility.

The third barrier to realization of the tremendous possibilities for growth has to do with our frame of reference--what we "see." A few years ago a survey of 13 states looked at instructional uses of new technologies in higher education. There was great clarity and agreement about obstacles to use of technologies and the policy steps that were most important: "needing money" ranked higher than everything else. Much, much lower down on the list came "collaboration," and far fewer than 50% of respondents felt that information sharing and professional networking were "very" important.

This small survey is an instructive glimpse of frames of reference that affect how we go about our business. I would guess that a very high proportion of us belong to one or more consortia or network. Speaking for myself, I tend to see my most vital links to be with colleagues engaged with media in the service of distance education. After having managed several traditional, print-based independent study (correspondence study) programs for a number of years, I have found myself talking less and less to my former correspondence study colleagues. I also feel that they, in turn, are viewing me a little warily, not unlike the game warden who was watching a man standing in a quiet stream.

> The man kept reaching for sticks of dynamite, lighting them, and throwing them into the stream. Fish just shot out of the water everywhere. He scooped them up and continued. The game warden went over and told him off at some length. The man simply looked at him and said "Do you want to fish or do you want to talk?"

What I am getting at is this. We in distance education fall on a spectrum of shared activity. The spectrum isn't a great chain of being, from a lower to a higher order; it bespeaks different approaches, and some different professional motivations and values while moving toward similar goals. That spectrum is widening. We are drifting apart, and we all have something to lose as we go our own ways. Despite our differences, that distance education spectrum contains the best friends and most useful resources we've got. But our consortia and associations reflect this "bipartisanship" less and less. We are talking more and more, to ourselves.

There are few forums where the technologically oriented set out to learn from, and with, our colleagues in print-based distance education. Everything we know about information-sharing, coalition-building, and forcefulness tells us that such divergence within distance education is not in our best interests. Even the way in which we pose problems or their solutions varies immensely along the spectrum of distance education. Yet no single approach is superior under all conditions. We ignore each other's expertise along that spectrum at our peril.

Why "at our peril?" Because we are going to need each other more, not less. It's no longer a question of whether post-secondary institutions and associations are going to serve adults in mainstream fashion, but what role we are going to play. As one of our colleagues said recently, our business is becoming everybody's business. The latitude of being on the periphery is vanishing. Every trend tells us that to slide into two distance education entities, with less and less to say to each other, would reflect poorly on us.

I want to close with three observations and three predictions. My observations are these:

1. New technologies are, in fact, one of the most powerful forces acting on behalf of adult learners that we will see in this century.

2. New technologies make professional collaboration mandatory.

3. New technologies require the rethinking of our received knowledge about ways of doing things, and who we are in this process.

My three predictions are these:

1. Knowledge is going to have an even shorter shelf life than we imagine.

2. Conventional definitions of how, when and where education takes place are already eroding faster and faster. As this occurs, our role will come under severe scrutiny. The closer this role looks to fit the central mission of a campus, the more it will be perceived as someone else's job.

3. Finally, I believe "mental fitness" will become a mandatory way of life much as has physical fitness. People will use sources of educational delivery that span the current telecommunications and print-based spectrum--and more. The global exchange that lies ahead will be on a scale that we can't begin to comprehend. There is a global story about to unfold.

Against this backdrop, does it seem natural, predictable and inevitable for the spectrum of distance education to drift apart? What makes sense is to act on the connections between us, and recombine old knowledge and new knowledge from that spectrum into a forceful new vision not of what distance education is, but what it can be if only we have the shared insight to see it--and act on it.

1. Strange, J.H. 1983. Preparing for today tomorrow: faculty training for the new technologies. AAHE Bulletin, October, 8-14.

2. Cleveland, H. 1985. Educating for the information society. Change, July-August, 13-21.

Strategies for Applying Audio Teleconferencing to Distance Education and Training

Marcia Baird, Director, Instructional Communications Systems, University of Wisconsin-Extension

and

Mavis Monson, Instructional Design Coordinator, Instructional Communications Systems, University of Wisconsin-Extension

Properly designed and taught, education delivered by audio teleconference is effective. But research also indicates that teleconferencing differs from traditional face-to-face communication in a number of important ways. It is the skillful adaptation to these differences that is the mark of the successful teleconference teacher.

> ***Key is the ability to develop new strategies that bridge the distance between the instructor's classroom and the remote classroom(s). That means the ability to develop, without the assistance of non-verbal cues, the communication links with each student that are considered vital to good teaching.***

Some may argue for little or no time spent in faculty training—any needed audio communication strategies can be acquired "on-the-job." That—in the simplest case, it's a matter doing what comes naturally. Now, it is true that a neophyte to teleconferencing can gain skill and confidence **over time**, especially if using an audio system on a regular basis. Many users develop successful strategies from "what works, what doesn't." But "on-air" communication strategies are just half of the teleconferencing equation—and once the course begins, it may be too late for some essential planning and preparation.

Based on past experience in working with the users of a large, statewide audio teleconference network (ETN) and a dial-up nation-wide telephone bridging service (WisLine), we would argue for early training and planning for faculty who are designing courses for audio teleconferencing.

To assist new users in quickly capturing the essentials of teleconference design, a model was developed at Instructional Communications Systems, University of Wisconsin-Extension. The model is based on research in teleconferencing and in related fields in the social sciences and education. Building on the research

base, extensive interviews were conducted with experienced faculty and staff who had used teleconferencing as an instructional or training medium, or for conducting meetings by ETN or WisLine. They represented, but were not limited to, such diverse disciplines as music, agriculture, medicine, mathematics, law and creative writing.

From a comparison of accepted theory and current practice, we isolated four separate areas—or strategies—that appear to strongly relate to the effectiveness and/or satisfaction of teleconferencing programs for the participants. We'll briefly describe each strategy, beginning with a definition, then provide some further detail on the concept and its implementation.

> ***Humanizing is the creation of an environment which emphasizes the importance of the individual and which overcomes any sense of distance by generating a feeling of group rapport.***

One of the main ways of beginning the "humanizing" process is to establish some type of personal information base about group members. This may help counteract the feeling expressed by some participants that teleconferencing is less personal than face-to-face settings. In a remote learning environment where individuals may be all alone, it is important that some humanizing links be formed.

Those instructors who made a number of personal visits to the distant classroom, both before and during the course offerings, noted that students showed more positive feelings towards the mode of instruction.

Other ways of helping students identify with their instructor— and other students— included providing a slide of the teacher, and/or pictures of the teacher and other students, sending a class roster of participants to everyone in the class, and using names frequently when individuals made contributions to the discussion.

> ***Providing for Participation in the communication and learning process involves transcending technological factors to allow a more natural interaction to take place.***

Studies suggest that there is an automatic training over time which allows individuals to consciously and unconsciously adapt their communications

habits to teleconferencing. Initially, however, teachers and students may experience "stage fright" in using microphones *(most audio teleconference systems use microphones in classroom/conference room settings).*

It's important that the teleconference teacher gain some type of experience with the audio equipment before class, to ease any apprehensions. With that experience, it is then the role of the teacher to help the students, encouraging them—frequently—during the first class and giving them plenty of time to react to questions *(considering they may be sharing microphones).*

Ground rules (or "protocol") for how and when the participation will occur—though foreign to traditional classrooms—surprisingly become an asset in helping individuals feel more comfortable in a teleconference classroom, as the structure helps expectation-setting in this new medium.

The flow of communication in a classroom can be facilitated by planting questions, assigning individuals or groups to serve as audience spokespersons, or by giving group assignments. In addition, the types of participation techniques useful to adult educators find a valuable niche in teleconferencing. Instructors have adapted almost every type of adult education teaching technique to teleconference planning. Techniques which work especially well are group problem-solving, brainstorming, case study and buzz groups.

The need for a <u>Presentation Style</u> which constructs the message in a way that will be received, understood, and remembered is a third strategy.

One important factor in designing purely aural messages is the difference between the rate at which we speak and the rate at which we think. The average rate of speech for most people is between 125 and 150 words per minute, while the brain processes data at much higher rates. The ensuing gap often causes listeners' minds to wander. Presenters using audio teleconferencing should realistically acknowledge that some of the group will be distracted at any given moment. Repetition and summary can help provide cues for these listeners whose thoughts have momentarily strayed.

Fatigue which results from listening to an aural message over an extended period of time is another factor to consider. Listening research indicates that this tired feeling is the result of restlessness and boredom, suggesting that messages be designed with more variety, such as using shorter modules and more change of pace.

Verbal cues help emphasize the important ideas to be remembered. Use of phrases which stress the importance of remembering the "ideas-to-follow" appear to help reception and retention of the material. And research suggests that the old rule of *preview-present-review* is effective partly because it guides participants to the succeeding material, then guides them after it is presented to know what is important to be retained.

Printed support materials such as outlines, word lists, supplementary articles, bibliographies and graphics help support the audio message by providing a second way besides the voice to receive the information. Print also serves as a permanent record and reviewing device.

Feedback (building in mechanisms to complete the communications loop) is necessary to enable both speaker and listener to correct errors and omissions and to help improve future communications.

In a face-to-face setting, feedback is received through many nonverbal cues—a nod of the head, a look of puzzlement. Working with audio feedback only, a teleconference teacher needs to build in opportunities for feedback. This feedback is important not only to the teacher, but serves a critical role for students, as well.

One role is for motivation. A **teacher is motivated** by knowing that students are beginning to assimilate and apply the course material. This generates the instructor's enthusiasm which, in turn, invigorates the aural presentation style, providing a variety of tone and pitch. In essence, the more feedback, the better a presentation will be.

The easiest way to assure feedback during a teleconference is to plan for it. Some instructors ask a specific individual at each location to provide certain types of feedback by observing the rest of the group. Was the material presented too fast? too slowly? at too complex a level? not enough examples? Questions are asked after each natural division in the materials.

Other instructors prefer a less structured type of feedback by suggesting that members of the audience interrupt at any time.

Feedback is also important for students. **Students are motivated** by knowing how well they are doing in terms of meeting course objectives. Times built into

the agenda for student feedback are well-worth the "air-time" spent. Often teleconference lesson plans are too packed with information giving, rather than student feedback. If it's not appropriate to receive student feedback during the class sessions, an option is to set up "electronic office hours" *(a specified time when the teacher will be available)* to provide remedial help or guidance on projects.

Using these strategies in the design of audio teleconferences is one way to approach the training of new and potential users. The design model is a flexible, practical, easy to use and effective way of developing confidence in using this medium.

You'll need to fill in the details as they pertain to your particular situation. In addition, we've found that a single source of training information, whether that be a how-to booklet, a workshop, a videocassette or a one-on-one consultation cannot carry an entire teleconferencing training program. You need to be able to reach the user with a generous choice of options, with the opportunity to control the times and the pacing of the training, as well.

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Program and Design Considerations in Videoconferencing

Presented by:
Mel Muchnik and Sally Petrilli
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This seminar examined the elements and concepts inherent in videoconferencing, including the criteria for selecting and designing a successful videoconference. In March 1988, Governors State University and The Johnson Foundation produced a 3½ hour national videoconference, "Racism on Campus: Toward an Agenda for Action," which was received by 180 sites across the country. The seminar presenters, who fulfilled the roles of executive producerand instructional developer, used their experiences in videoconferencing to build a planning and design process for seminar participants. A seminar option allowed participants to bring videoconference proposals for presentation and discussion.

Seminar Objectives. Conducted in the format of a participatory workshop, the seminar objectives were:

1. to identify the elements of a videoconference;
2. to identify the functions of the videoconference team
3. to examine a case study of a successful videoconference;
4. to evaluate participants' resources for creating a videoconference team, and;
5. to develop a proposal for a videoconference using workshop criteria.

Basic considerations and perceptions. Videoconferencing is a relatively young hybrid of conferencing and television, yet has its own emerging distinct qualities. A careful consideration of these qualities is requisite in designing a videoconference appropriate for the objectives, the subject matter and the audience. Yet perceptions and misperceptions abound. Is production "glitz" essential? Does it get in the way? Is interaction essential? How much? How long should a videoconference run to be credible and marketable? Can any good conference be televised and become a videoconference? How do the local receive sites affect design? Should the videoconference presenters be a showcase of people in your own institution faculty?

A point of departure for the seminar involved identifying these basic concepts, perceptions and misperceptions. The elements of a videoconference include: the concept, audience, design, technical arrangements, presenters, interaction, production, marketing, execution and response.

The project team. The videoconference project is as much an organizational challenge as it is a creative and intellectual endeavor. Fundamental to the effective delivery of a videoconference are the early decisions identifying the key members of the project team and their functions. If necessary, more than one function may be performed by a team member. Minimally, these functions include:

1. an executive producer and coordinator (the project leader)
2. an instructional designer (including functions of research, producing and writing);
3. a subject matter expert(s)
4. a television producer/director
5. a marketing and receive site coordinator

While specific roles are fulfilled by each member of the project team, the value of each member being involved early in the process and contributing to the overall effort becomes quickly apparent. What receive sites are asking may affect choices in presenters or what is included in the videoconference itself. Similarly, the marketing person becomes knowledgable about the videoconference and how it is developing, an invaluable asset in dealing with potential receive sites and audiences. The team is engaged in a dynamic process that requires interaction and the sharing of information from early in the planning phase to the videoconference presentation and follow-up.

Case study: "Racism on Campus: Toward an Agenda for Action". As an example of the dynamic process of planning and executing a videoconference, a case study is offered of a recent national videoconference. An estimated 9-11,000 participants at 180 receive sites took part in an event designed to catalyze processes at individual campuses well beyond the videoconference itself. The goals of this videoconference were:

1. to bring together those on participating campuses who shared an interest and/or responsibility for the local racial agenda;

2. to examine recent incidents of racial violence and intolerance, as well as institutional conditions, from a historical and contemporary perspective via pre-recorded videotape and live discussion with educators and students; and

3. to assist receive sites' use of the experience, dialogue and information from this videoconference to examine their own racial agendas and develop or deepen an appropriate commitment to action.

The videoconference was sponsored by Governors State University and The Johnson Foundation of Racine, Wisconsin, in co-sponsorship and/or cooperation with five national higher education associations as well as the Illinois Committee for Black Concerns in Higher Education.

Of particular concern to the seminar in considering this case study is the history and concept of the videoconference, the planning process, funding, formation of an advisory committee, the design process, and production. Videotape selections from the videoconference illustrated the design and production outcomes.

Criteria for Videoconference Selection. As a guide for developing a videoconference proposal, criteria for selecting competing proposals were presented. These included:

*Rationale-- What need is addressed? Is the subject timely?

*Audience-- Who is your audience and how is that matched to potential receive sites? How do receive sites find them? What is the audience potential?

*Institutional Goals-- What is most important to the originating institution? Income? Credit generation? Visibility for the institution?

*Program Objectives-- What will be accomplished? What will receive sites do? To what extent will it be interactive?

*Presenters-- Who will they be? Do they have credibility? A reputation recognized by your audience, including a national or regional audience? A good TV presence?

*Co-sponsors/underwriters--Who are they? Are they likely to join you in this venture? Can they increase credibility? Help with marketing? Cover some or all costs?

*TV Medium-- Is this a suitable subject for the medium? How can you take advantage of the medium?

Group Activity: videoconference proposal. Based on participant questionnaires, videoconference project teams were formed to brainstorm and develop a videoconference proposal based on the above criteria. Participants bringing proposals were asked to recast the proposal considering the seminar criteria. Proposals were then presented by each of the project teams. Each proposal was discussed and rated by the entire seminar.

Summary and Conclusion. While there is no magic formula for producing a successful videoconference, a strong early consideration of videoconference organization and design are essential ingredients for any measure of success. Careful consideration of the videoconference elements and a willingness to recognize and engage in a dynamic process assists the development of a videoconference responsive to the needs of the identified audience and is more likely to maximize audience potential.

Whether a videoconference is a critical success is less likely to come from rigid adherence to prescribed formulae, and more from creative approaches to the subject matter within an agreed upon design, a creative and intelligent use of the television medium, and an energetic development of the detail required to achieve the objectives set for both the videoconference and the participants at the receive sites.

TECHNIQUES FOR IMPROVING MEDIA-BASED LEARNING

PART I.
Techniques for Learning from Television

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PART II.
Techniques for Learning from Audiocassettes

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Part I. Techniques for Learning from Television

This section discusses instructional strategies and support services that can be used by instructional designers to: (a) help distant students learn from the television component in a self-instructional course, and (b) integrate the television instruction with other materials in that course. These instructional strategies and support services are presented in a paradigm. (See Figure 1.)

The strategies and support services described in the paradigm are based on information synthesized from two sources:

1. A survey completed in 1987, of 49 postsecondary educational institutions in the United States that use communications technologies to deliver continuing and/or professional education, and

2. Review of research related to: (a) adult learning and current learning theories, (b) learning from television, and (c) the nature of distance learning.

The survey results provided information on: (a) means currently used by institutions to integrate television programs with textual and other media in distance education courses, and (b) student support services provided by institutions and the effectiveness of these services.

Pre-broadcast notes preparing students for what they will see in the television program, and follow-up exercises after viewing were the two types of supplementary materials that were used most often by institutions surveyed to integrate television programs with the rest of the course. They were considered to be effective in helping students learn from television programs. They have an advantage over techniques that have to be incorporated into the television script,as they can be used by institutions that do not produce their own television programs. These two types of supplementary materials can be of immense help in a non-interactive delivery system.

Exercises requiring student responses during transmission were used by few, but were considered to be a very effective technique for integrating television programs with the rest of the course. This finding has implications for the production of television programs. Using techniques which require students to respond during the transmission will make them active participants and contribute to their learning. It also implies that interactive television technologies which provide a telephone feedback system can be more effective than a non-interactive mode.

Another effective technique in helping students learn from television was screen presentation of the correct answer and discussion. Immediate knowledge of whether a student's response was accurate will enhance his or her learning. This technique, however, has to be built into the television script, or used by an instructor in a live presentation.

Other techniques used by institutions to integrate television programs were: tests, quizzes and assignments, study guides, handouts, textbooks, study groups or discussion groups, student instructor meetings, tutoring via phone, workshops, seminars, computer mail, and computerized prescriptive feedack on quizzes. Very few reported that they used Tutored Video Instruction (TVI) methods.

One of the most helpful sources of support in a distant teaching system was the study guide. Therefore, the study guide can be used as a means by which a television component can be successfully integrated with the rest of the course. Techniques for the effective use of the television program can be presented in the study guide.

Forms of student support considered to be very helpful by institutions using television as a main delivery medium fall into four categories each representing a different kind of support:

1. Study guide -- guidelines for studying.
2. Interaction--telephone office hours for faculty, telephone calls initiated by faculty.
3. Feedback--individualized feedback from faculty and computerized feedback.
4. Access to library resources.

These four kinds of support services present means by which a video component can be integrated into a distance teaching system.

Other forms of student support used by over two fifths of the institutions were: face-to-face academic advising, seminars or workshops, letters from faculty or staff commenting on student progress, newsletters and residential courses. It is necessary to determine which of these services can be used effectively to support video-based instruction.

Establishing study centers for off-campus students is a good way of providing access to media equipment such as videocassette players and library facilities including television programs on videocassettes. Study centers could also provide an opportunity for students to interact with each other and a tutor.

Effective instructional strategies and student support services derived from the survey and the review of research are integrated into each stage in the paradigm, and the interrelationship between the television program and other media are delineated.

The paradigm is influenced by the information-processing theory of learning and is based on two models of instruction:

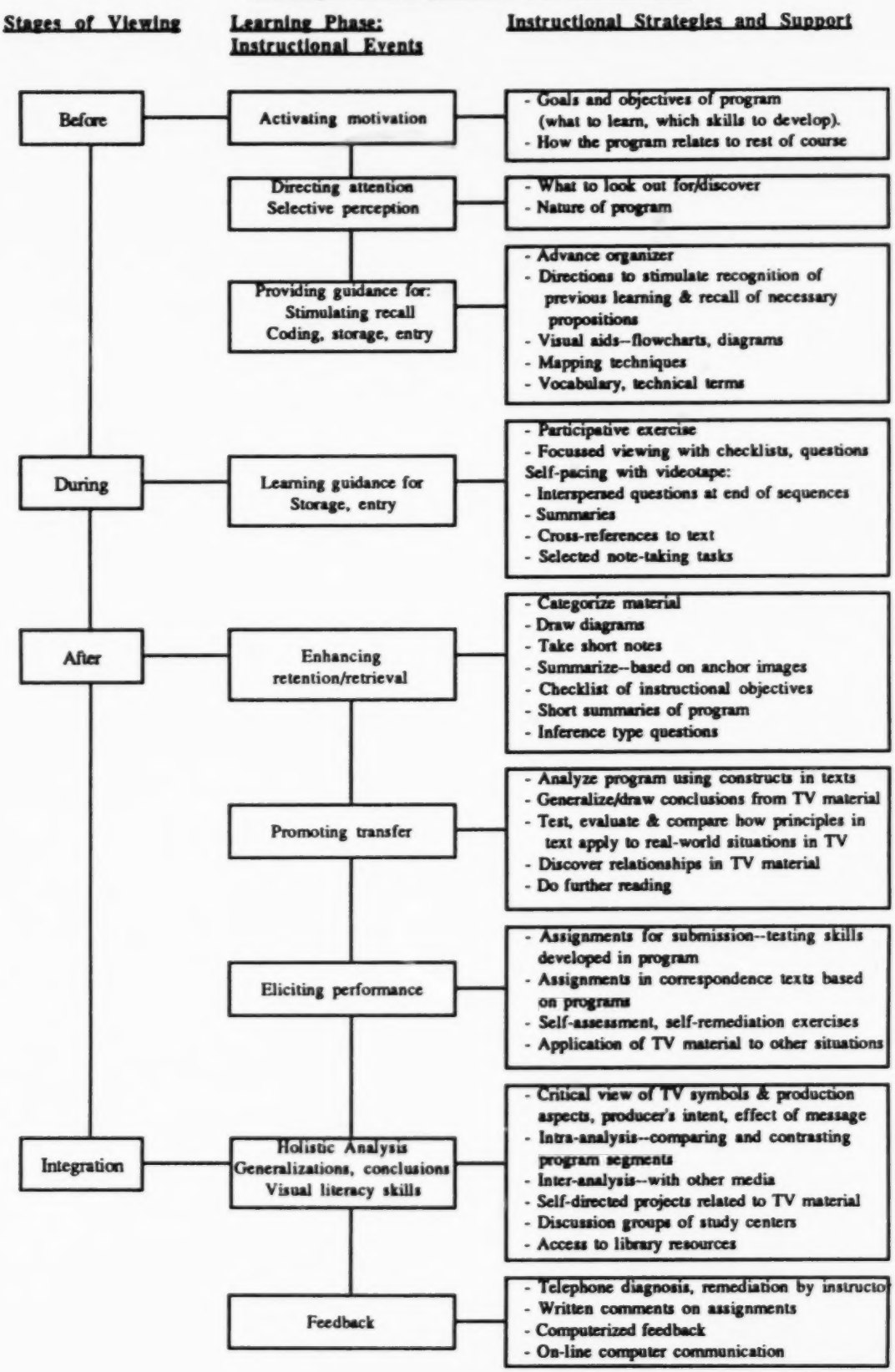
1. Gagne's model of the "relations between phases of learning and events of instruction," and

2. Wohl and Tidhar's "macro and micro integrative teaching system of television viewing (ITS/TV)."

The paradigm consists of three stages which follow a natural sequence of television viewing: "before," "during" and "after" viewing the television program. The final stage provides for the integration of the television viewing experience. Each stage of television viewing is matched up with the learning phases described by Gagne, and the instructional strategies and student support described in the paradigm are the "instructional events" that are designed to facilitate learning in each of these learning phases.

Figure 1

A Paradigm for the Integration of Video-Based Instruction


Stages of Viewing
Learning Phase: Instructional Events
Instructional Strategies and Support
Before
Activating motivation
- Goals and objectives of program (what to learn, which skills to develop).
- How the program relates to rest of course
Directing attention Selective perception
- What to look out for/discover
- Nature of program
Providing guidance for: Stimulating recall Coding, storage, entry
- Advance organizer
- Directions to stimulate recognition of previous learning & recall of necessary propositions
- Visual aids--flowcharts, diagrams
- Mapping techniques
- Vocabulary, technical terms
During
Learning guidance for Storage, entry
- Participative exercise
- Focussed viewing with checklists, questions
Self-pacing with videotape:
- Interspersed questions at end of sequences
- Summaries
- Cross-references to text
- Selected note-taking tasks
After
Enhancing retention/retrieval
- Categorize material
- Draw diagrams
- Take short notes
- Summarize--based on anchor images
- Checklist of instructional objectives
- Short summaries of program
- Inference type questions
Promoting transfer
- Analyze program using constructs in texts
- Generalize/draw conclusions from TV material
- Test, evaluate & compare how principles in text apply to real-world situations in TV
- Discover relationships in TV material
- Do further reading
Eliciting performance
- Assignments for submission--testing skills developed in program
- Assignments in correspondence texts based on programs
- Self-assessment, self-remediation exercises
- Application of TV material to other situations
Integration
Holistic Analysis Generalizations, conclusions Visual literacy skills
- Critical view of TV symbols & production aspects, producer's intent, effect of message
- Intra-analysis--comparing and contrasting program segments
- Inter-analysis--with other media
- Self-directed projects related to TV material
- Discussion groups of study centers
- Access to library resources
Feedback
- Telephone diagnosis, remediation by instructor
- Written comments on assignments
- Computerized feedback
- On-line computer communication

Part II. Techniques for Learning from Audiocassettes

General Biological Concepts: An Audio-Tutorial Course

During the last fifteen years Independent Study at the University of Kansas has collaborated with regional community colleges to develop and refine General Biological Concepts, an audio-tutorial introductory biology course for college students. James E. Arnwine, chairperson of the Division of Sciences and Mathematics and instructor of biology at Independence (Kansas) Community College, prepared the course materials.

General Biological Concepts consists of a course study guide, forty-three audiotapes of prepared lectured material, and a bound set of tapescripts that replicate the course lectures in print. There is no other text for the course.

This course, which is based on principles of mastery learning, is intended to arouse students' interest in biology and to lead them to an understanding of the subject. In his course preface, Professor Arnwine stresses the importance of mastering one concept before moving on to the next. The lectures on cassette, each 15-20 minutes long, are ordered so that each concept builds on earlier lessons and lays the groundwork for what follows. Students are encouraged to work at their own pace and to replay the tapes or review the other materials as often as necessary.

Each lesson begins with a set of educational objectives, which are ordered according to the sequence of the lectures. Students are told in the course preface that the instructions accompanying the objectives are to be taken literally. They must be able to perform the objectives with at least seventy-percent accuracy to pass the course. General Biological Concepts includes eight examinations, all of which are based on the lesson objectives.

In addition to information provided in the course objectives and lectures, each concept is further illustrated through laboratory experiments, problems, written exercises, and various visual media. Numerous study sheets, several of which are accompanied by overlays, are bound into the course study guide. These study sheets illustrate fundamental topics and are designed to be used in correlation with the lectures. As students listen to the audiotapes or read the tapescripts, they are asked to pause, either to complete an exercise or to review a study sheet.

Students taking General Biological Concepts in a classroom setting may have the opportunity to participate in optional discussion groups designed to help participants master difficult concepts, explore topics in greater depth, or enrich their understanding with supplemental material. Because this course is

designed primarily for independent study, the instructor serves as both a learning facilitator and a tutor available for consultation. Students are encouraged to work closely with the instructor to tailor the course to their individual needs.

The success of General Biological Concepts is illustrated in several ways. Prior to the development of the materials for General Biological Concepts, more than forty percent of Professor Arnwine's students received "D" or "F" grades for their introductory biology course; now less than ten percent of his students who use this audio-tutorial instruction receive "Ds" or "Fs. The course materials have been adopted or used as a teaching resource by sixteen educational institutions in the United States. On two occasions the National University Continuing Education Association has recognized General Biological Concepts as an outstanding course.

The course has been thoroughly revised twice. In these revisions, which were undertaken in response to students' and instructors' evaluations, several new lessons have been added to bring the course contents up to date and course components have been refined. In addition, an extensive new glossary defines terms used in the lessons.

Students rate General Biological Concepts highly. They like its informal mode of instruction and the opportunity for self-paced learning combined with dialogue with their instructors and other students. They feel that mastering these concepts provides them with a solid foundation for completing other university-level science courses. Students who must drive long distances to class sometimes tape the lectures for review on their automobile cassette players. Others play the tapes on their headsets walking to class. They like the option of studying on their own time in their own way.

General Biological Concepts is the product of a unique collaboration between Professor Arnwine, other community-college biology instructors, and the curriculum-development staff of the Independent Study unit at the University of Kansas. This is a carefully designed, well-integrated course that demonstrates the contribution that distance education can make to traditional classroom instruction.

The Effective Use of Study Guides

Effective instruction requires a carefully structured course that incorporates appropriate media, support services, and texts. The study guide is the glue that binds the components together, while also providing instruction.

Despite the widespread use of mediated components in distance education courses, it is likely that most courses will be print-based in the near future. Easily accessible media (for example,

audio- and videocassettes) will complement study guides where appropriate. Convenience and economy are the primary reasons that study guides have remained central to the distance education curriculum.

Many study guides reflect recent pedagogical and publishing innovations. In addition to the usual components--course goals and objectives, lesson introductions, illustrations, self-assessment questions, writing assignments and information about preparing for examinations--an instructionally effective study guide provides students guidance in when and how to use the media components and integrates the media into the course as a whole. Desktop publishing offers opportunities to create "book-like" publications and frequently reduces costs of publishing study guides. New word-processing techniques have also helped resolve storage and revision problems.

Despite these innovations the primary challenges of course creation remain the same: providing both content and direction, personalizing instruction, inspiring self-sufficiency, and overcoming isolation. The study guide is the foundation on which the course is built.

DISTANCE LEARNING: A FACULTY PRIMER

Patricia Keir, Associate Dean, Instructional Alternatives, College of DuPage
Eileen Ward, Assistant Professor of English

BACKGROUND DESCRIPTION OF CTL AND DISTANCE LEARNING AT COLLEGE OF DUPAGE

For over fifteen years, the College of DuPage has offered instruction in several broad curricular and programmatic areas through a distance-learning, self-paced format. Designed to provide increased access to credit and remedial courses when busy schedules or learning style preferences make home-based, self-paced learning essential or preferable, the college's flexible learning, telelearning, and individualized remedial courses enroll over 4000 students each quarter. Over 150 instructors, many of whom are part-time, facilitate the self-paced learning of over 100 credit and remedial courses -- both on campus in a centralized Learning Lab and in four off-campus Learning Centers. A catalogue of all courses -- and a description of the various distance-learning modes they are delivered in--will be distributed at the workshop.

Delivering these programs in the distance-learning format achieves several purposes:

- the establishment of a non-traditional educational delivery system to supplement the classroom-based approach at the college. Distance learning courses are equivalent in content and transferability to their classroom alternatives.
- the offering of self-paced, individualized instruction in remedial-developmental areas to meet the varied needs and schedules of students in a large open-enrollment institution.
- A chance for students to continue their studies without interruption when it is impossible for them to participate in classroom-based learning.

It is important to note that there are several forms of distance learning offered at the College of DuPage; the same course content is often delivered in several ways -- with more or less institutional pacing or amount of required contact with the instructor. Flexible learning courses require regular, brief meetings with instructors (English requires a weekly ten minute appointment); telelearning courses - which have a large media component - rely primarily on telephone contact between student and instructor. Math and accounting courses are facilitated by instructors who staff a central lab so that help is accessible to students as they require it. Occasionally, a course will combine some classroom sessions with independent learning to achieve a course objective. Spanish, for instance, meets one hour per week in a classroom setting for conversational practice. A new approach, Guided Telelearning, has set times for group video viewing along with the instructor while the rest of the course is undertaken independently. All other coursework, however, is self-paced by individual students.

Precisely because faculty-student interaction in these programs is minimal, it is critical. Distance-learning faculty are oriented and guided by a full-time faculty coordinator with a partial assignment to supervise the delivery of distance learning in specified disciplines. In order to better facilitate the orientation of faculty who have never had experience in distance-learning, and to reduce the amount of time the coordinator has to spend in one-on-one training, a distance-delivered training module was developed.

DEVELOPING AND DELIVERING A TRAINING MODULE FOR DISTANCE LEARNING FACULTY

Until 1988, distance-learning faculty were evaluated using the college's standard, classroom-oriented evaluation forms and were trained through voluntary participation in the college's traditional, classroom-focused staff development activities, (i.e., workshops on classroom dynamics, syllabus preparation, test development, motivational techniques, etc.)

In early 1987, a decision was made to create a new evaluation instrument for distance learning faculty and, concurrently, to design a training package for these instructors which addressed the unique nature of their instructional role and tasks. Almost immediately, it became clear that developing these items from scratch would not be a simple task. Before criteria for rating instructor performance in these programs could be arrived at and methods of teaching teachers to perform most effectively chosen, a careful and thorough description of the nature of the roles, responsibilities, and interrelationship between students, instructors, and materials needed to be derived. This entailed more than a survey of distance learning literature. Extensive input and involvement from current instructors and students was essential -- both through survey and participation. As the lists of instructor tasks and the general role of the distance learning teacher was developed, clarified, and differentiated from student role and tasks, constant step-by-step feedback was solicited from faculty and staff.

The process of defining the teaching role in distance learning was begun by distributing an open-ended survey to current faculty and staff requesting a listing, analysis, and prioritizing of instructor tasks and responsibilities of staff. Fifty-two instructors and twelve staff members replied, some extensively. Tabulation of the responses resulted in the identification of the following major role categories:

1. Procedural Matters such as grading, attendance, issuing of incomplete grades, and making and recording contacts.

2. Motivational and Communication Tasks consists of constructive and timely response to individual student work, friendly, positive attitude, and teacher-initiated contact with students.

3. Information-Giving about subject matter and course procedures and policies.

4. Effective Facilitation of Effective Self-Paced Learning including helpful orientation, assisting students on goal setting, helping students evaluate their own progress and use of effective learning strategies.

When further surveyed, distance learning teachers focused on several key differences between classroom teaching and distance learning delivery. Most often, they reported that they had found it necessary to alter radically their perspective on student and instructor roles and to allow that distance learning is much more student-centered than instructor-centered; thus the nature and organization of the student's engagement with course materials is of paramount concern, more important to student success than instructor input. Interestingly, students and faculty both reported feeling primarily responsible for student motivation and amount of learning. Many students indicated that they developed an enthusiasm for "learning how to learn" as they experienced distance learning's pragmatic need for personal initiative, motivation and pacing. Finally, a thorough study of distance learning from research and literature by several committee members also provided data as a committee sought to stipulate role demands and evaluation criteria for distance learning teachers.

Eventually, the following five general areas were chosen to structure the content of the "to-be-developed" staff development module:

(1) How distance-learning works at the College of DuPage
(2) The role of the faculty in distance-learning
(3) The role of the student in distance-learning
(4) Instructing and learning through media
(5) Locations and methods of delivery

Not surprisingly, it was decided that the format chosen to **deliver** this faculty inservice should not be a traditional workshop but a distance-learning "course" instead. Since, in this case, the medium was to be the message, faculty will learn about the distance-learning experience by learning at a distance. Offering the instruction through a distance-delivered, media-based mode will increase accessibility for busy part-time faculty who prefer to cover the material at home in a self-paced manner while also allowing them to experience the course as a distance-learner.

MODULE COMPONENTS

The major focus in the workshop will be to present the actual components of the new distance learning inservice to A Primer for Faculty. These components,which reflect exactly the components students encounter, are:

1. **The "Assigned Instructor"** -- The full-time faculty coordinator responsible for the discipline area of the participating faculty member guides the independent study of the faculty member. Just as students have access-ibility to their instructors at specified times and places, so also the student/faculty participant has parallel contact with the course instructor.

2. **The "Text"** -- THE DISTANCE LEARNING MANUAL FOR FACULTY has been prepared by Instructional Alternatives for distribution to faculty teaching in the delivery mode of distance learning. It is divided into five principal sections dealing with: how distance-learning works at the College of DuPage, the role of the faculty in distance-learning, the role of the student in distance learning, instructing and learning through media and the locations and methods of delivery.

3. **The Study Guide** -- Complementary to the Manual, the Study Guide directs the independent study of the participant and inter-relates the print and media materials to be pursued.

4. **The Videos** -- designed to parallel and implement the content in the Manual and the Study Guide, the five videos are to be viewed after the work with their parallel printed materials has been completed.

5. **The Tests** -- Two objective tests measure the progress of the participant in a purely content-related manner and are required to be taken in the course of the study.

6. **The Written Projects** -- Examples are suggested in the Study Guide, and participants may in conference with course instructors design appropriate projects particularly related to their special disciplines. Two projects must be completed as a minimum requirement.

7. **The Information Sheets, Syllabus and Telelearning Guide** -- To parallel the learning experience of all students in Distance Learning, faculty participants in this course receive the standard materials distributed to all students, (information sheets and Telelearning Guide). Since each course has a specific syllabus, each participant also receives a copy of the syllabus written specifically for this course.

ADAPTING TO THE NON-TRADITIONAL CLASSROOM: TRAINING PROGRAMS FOR FACULTY AND STUDENTS[1]

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The University of Maryland's Instructional Television (ITV) System was established in 1976 to provide graduate-level continuing education to engineers and scientists in the greater Washington area. ITV broadcasts more than 100 live, interactive academic courses each year -- over 200 hours of programming each week.

The courses originate in ITV's four studio-classrooms on the College Park campus, each of which closely resembles a standard classroom, but is equipped with cameras, microphones, and television monitors. University of Maryland faculty members teach regularly scheduled classes in these classrooms, and simultaneously, are broadcast via microwave and satellite to as many as 200 remote sites nationwide.

Because the ITV system links high tech classrooms filled with traditional (on-campus) students with clusters of non-traditional (off-campus) adult learners, faculty members who teach on ITV and students who view the courses off-campus have to contend with a new technological environment in their classrooms, and a new social environment as well.

In an ideal world, faculty members and students would view ITV courses as a challenge and an opportunity to add to existing skills. Typically, however, they discover that much of what worked for them in the traditional setting is not particularly effective in televised classes. Not knowing how to modify their behavior to adapt to the new situation, they become frustrated, resentful, and generally resistent to ITV. Clearly, both faculty members and students need guidance if they are to make the most of their ITV experience. At the University of Maryland, we have designed, tested, and are now offering two short training programs, one for faculty members and one for students, to help deal with their resistance to television classes.

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[1] A version of this paper, co-authored by Sally M. Johnstone, appears in the Proceedings of the Lifelong Learning Research Conference, University of Maryland, College Park, Maryland, 1988.

[2] All of the work described in this paper was conducted jointly with Sally M. Johnstone, University of Maryland - University College.

About three years ago, the ITV system expanded rapidly. The number of broadcast channels doubled, with a concomitant increase in the number of courses and students. At the same time, a satellite delivery component through the National Technological University (NTU) opened University of Maryland classes to students across the United States. Almost at once, we began to notice an increase in the level of unhappiness expressed by faculty members. Some of them spoke openly about their feelings. Others expressed their anxiety by refusing to consider the special demands of the ITV studio-classroom. They ignored the limitations of the television camera, for example, and wrote equations that stretched across the entire classroom-wide board. This left the camera operator with two equally undesirable alternatives: to televise the material in pieces, or to pull the camera lens back until the entire equation could be seen at one time, but not read, because the letters and numbers would be too small. Faculty members who taught like this were, in effect, rejecting their off-campus students. This increasing resistance to ITV led us to design the first of our training programs: a formal orientation for faculty members.

As a first step, we reviewed our files of end-of-term student evaluations. We also compiled data from the more informal ITV student "reaction reports" designed to encourage comments from off-campus students throughout the year. The results were clear. Most student complaints about faculty behavior fell into two categories: refusal to take the camera's limitations into account (as described above), and unwillingness to encourage off-campus students to take an active role in the class. Once this information was gathered, we proceeded with our design.

Since 1982, when the Association for Media-Based Continuing Education for Engineers (AMCEE) published their monograph Towards Improved Candid Classroom ITV: Program Evaluation and Development Guidelines, Shanks' and Hochheimer's eight-step planning process has been a model for ITV program development. We followed these steps (audience identification, determination of behavioral objectives, identification of content needed, selection of instructional strategy, production, formative evaluation, promotion, and summative evaluation) as we created our training program.

Our target audience was a group of University of Maryland professors, most of them engineers or computer scientists, many of whom had taught for decades. We knew from previous attempts at faculty training that this group would approach our program unenthusiastically, considering it a waste of time. Our objectives were equally easy to identify. We wanted faculty members teaching on ITV to recognize and respond to the needs of their off-campus students by making effective use of the ITV studio-classroom and by avoiding the behavior the students had identified. The desired content followed from this. We wanted to include both administrative information and technical guidelines.

Determining the instructional strategy was more difficult. On the one hand, we wanted to be as thorough as possible. Our assumption was that our target audience would be unlikely to pursue information not included in the training session. On the other hand, we knew that the program had to be

relatively fast-paced. We envisioned a short orientation session using the medium of video itself to illustrate the salient points we wanted to express: that teaching over ITV should be enjoyable, that ITV provides technological support far superior to that available in traditional classrooms on the campus, that ITV is a natural forum for experimentation, and that a successful ITV teacher is sensitive to the needs of both on- and off-campus students. We also wanted faculty members to understand ITV's administrative requirements and to be aware of the administrative support provided by the ITV staff. The session, therefore, was designed to begin with a buffet supper in a conference room near the ITV studio-classrooms. There is no video equipment in this room, and the faculty members interact informally for about half an hour before the formal program begins.

We start the program by introducing key ITV staff members, who lead a forty-five minute discussion of administrative matters. These include such topics as exam security, how to handle homework assignments for off-campus students, and the importance of meeting the courier deadlines. (ITV runs a daily courier service to all its local sites.) All of this information is also covered in a faculty handbook given out at the beginning of the session, and the faculty members are encouraged to refer to the handbook for more details.

Participants then move to a studio-classroom where the microphone and cameras are briefly demonstrated. Then they watch our seven-minute faculty training tape, which was created with the predominately male audience in mind. Thus, the primary role model is a man teaching a technical course, and humor is provided by sportscasters. The videotape, ITV Nationals, features Mel and Lou (the two sportscasters) who give a running commentary on the performance of Donald, an ITV veteran competing in the ITV National Competition. As Donald teaches, he uses all the special elements of the studio-classroom. He also commits several of the most common errors made by ITV teachers.

When the tape ends, the group spends about half an hour discussing Donald's performance. The faculty members point out his mistakes, what he did right, and how he might improve. Through this discussion, and always in the context of Donald, they are able to talk about teaching on ITV without having to confess their personal fears.

Finally, each faculty member spends a few minutes trying out the microphone, the board and markers, the camera over the desk, and the other special features of the studio-classroom. The practice session prompts questions about teaching techniques, and encourages further discussions among participants and the ITV staff members. At the end of the evening, the faculty members fill out a short evaluation of the program.

In the Fall 1985 semester, the program was tested on a group of about forty faculty members, some of whom were veterans and some of whom were new to ITV. Overall, participants reported that they had both learned from and enjoyed the training program. They were certainly less anxious about using the ITV system after they had had a chance to try it out and to talk with colleagues about it. A further formative evaluation took place at the end

of the semester, when student evaluations were examined. There was about an 80% decrease in the number of complaints concerning faculty members' performance on ITV.

Once the training program's effectiveness was confirmed, we had to devise a strategy to encourage our professors to attend these voluntary sessions. Faculty members new to ITV are sent a formal invitation to the program and are then reminded of the time and place by telephone. The calls "sell" the program, and this method has proved remarkably effective. Almost 100% of the faculty members invited in this way have attended the program, and both their evaluations and the faculty grapevine have been positive about the experience. A different strategy is used for veteran faculty members, many of whom have taught on the system for several semesters without any special training. They are contacted by the director of ITV himself, and encouraged to attend. This approach has proved only moderately successful. After five semesters, there are still some long-term faculty members who refuse to participate.

We have shared our faculty orientation program with colleagues across the United States and many of them have adapted it for their own uses. This year, Region II of the National University Continuing Education Association awarded our program a commendation in recognition of creative and exemplary effort in new programs in continuing education.

Despite the decrease in student complaints as a result of the faculty orientation program, some off-campus students have continued to report unhappiness with ITV classes. A review of student evaluations and numerous phone interviews with off-campus students has revealed four main problem areas. Off-campus students are unprepared for the loneliness of distance-learning; they are afraid of, and therefore do not know how to use, the technology available to them (TVs, VCRs, telephone talkback equipment); and they are frustrated by unsuccessful attempts to talk with their professors. They also feel the subjects being taught are too research-oriented for them. We have designed a student orientation program to address the first three of these problem areas. (The fourth is obviously a matter for the academic departments.) In our design, we again followed Shanks' and Hochheimer's eight-step model to help us define audience, objectives, content, and instructional strategy.

Our target audience is part-time adult learners, about half of whom are male engineers and technicians taking graduate courses in engineering. The other half consists of upper-level undergraduates of both genders. Most of these students are taking their first television course. Our objective is to enable them to take responsibility for, and control of, the general process of learning via ITV. To do this, they need help both with ITV technology and with the process of becoming a successful adult learner. Thus, our desired content includes both ITV-specific and more general information.

Our success with the faculty orientation program encouraged us to use the video medium again, and to create another humorous, non-directive video program to be the core of the student training package. But we knew that ITV is attractive to many off-campus students mainly because they do not have to drive to campus. A required meeting of all students was clearly impractical. And the wide range of information we wanted to provide--everything from "How to Take Notes" to the telephone numbers of on-site training managers--required a lengthy written document. Our instructional strategy evolved accordingly.

We decided to produce a simple, clearly written student handbook to be given to all students as they registered for ITV classes. The handbook is designed to be updated each academic year. We also decided to produce a humorous video program, which would be broadcast each semester at the start of the first class meeting of every course. Copies of the program would be available at the off-campus sites, and students would be encouraged to take them home if they wished.

During the summer of 1987 we produced the videotaped program, Confessions of an ITV Student. It features Tim, a young engineer who describes his progress, after a traumatic beginning, as he not only learns how to be a successful ITV student, but becomes a role model for other students new to ITV. Both male and female students are shown, and the pseudodocumentary, silent-movie style is not gender specific.

We had intended to begin using the student training package in the Spring, 1988 semester. However, delays in creating a special instrument to measure its affectivity made that impossible. The instrument, a two-part questionnaire, is being developed this summer, and we expect to have the entire package in the field in September 1988.

We continue to look for ways to ensure success on our ITV system, and to share our ideas with our colleagues in the United States and abroad. We hope that our training programs will serve as models and as inspiration for those dedicated to maximizing the telecommunication experience for faculty members and students.

References

Shanks, Thomas E. and John L. Hochheimer. "Televised Instruction and the continuing Education of Engineers," in Hutchinson, Charles E. ed. Towards Improved Candid Classroom ITV: Program Evaluation and Development Guidelines, AMCEE, Atlanta, 1982.

3:15, Wednesday, August 3
TEACHING AT A DISTANCE WITH AUDIO-PRINT: FACULTY PERSPECTIVES

Presenters of The Annenberg/CPB Audio-Print Course Collection Project
Emily Auerbach, lead faculty for Modern Literature I and II
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NARRATIVE SUMMARY

I. Introduction
In 1981, Walter H. Annenberg, former U.S. ambassador to Great Britain, publisher and philanthropist, pledged to the Corporation for Public Broadcasting (the umbrella of both the national public television and radio systems) a sum of $150 million over 15 years for projects in higher education to expand opportunities for individuals to acquire a quality college education through the application of telecommunication and information technologies.

The Project's courses must be adoptable by individual colleges to be offered for credit. They can also be available for supplemental use in traditional classrooms and for informal learning outside the classroom. All of the courses are designed for students seeking a baccalaureate degree in liberal arts and sciences.

Formats of the undergraduate courses vary, depending on what seems most appropriate for the subject. Some use video, others audio, still other use computers -- and all are keyed to newly created or specially selected texts and study guides.

The video-based courses are delivered via public television and cable stations, and on cassette; the audio-based courses are delivered via public radio and cable stations, and also on audio cassette. Short modules of the audio components can now be heard as features on National Public Radio's News and Information programs, such as "All Things Considered" and "Morning Edition." Forty courses are now either in production or available for use.

Since 1982, University of Wisconsin-Extension, through its public broadcasting facility, WHA Radio, and its Independent Study Program, have been funded by The Annenberg/Corporation for Public Broadcasting (CPB) Project to produce a library of integrated audio-print courses to serve a national market of degree-oriented distance learners. While a national team of academics develops each course, the lead faculty are drawn from the professorial staff of the University of Wisconsin System. The audio-print curriculum, compiled by a faculty committee, includes some forty freshman-sophomore courses, 13 of which are either in production or available at this time. They include American History I and II, Introduction to Sociology, Introduction to Psychology, Introduction to Modern Literature I and II, Philosophy: Ethics in Business, Sociology: Marriage and the Family,

Political Science: Introduction to American National Government, Mathematics: College Algebra, Principles of Statistics, Nutrition Today, and Basic Concepts of Music.

II. Course Package Components

Each audio-print course consists of a series of 12 to 14 30-minute audio programs, text(s), a study guide, and an instructor manual. The texts are representative current standards in the field. They provide the written content basis for the course.

The audio programs, integrated with the text and study guide, are designed specifically for each course, and focus on concepts that can be handled most effectively via this medium. On the programs students hear leading scholars in the field in a format that stimulates active listening participation to enhance the understanding and retention of concepts presented. Various production techniques such as professional readings, dramatization, music and sound effects may be combined with the faculty interviews, discussions and analyses.

Some courses may also offer ancillary tapes to further enhance the print materials. They can be used for used for appendices--pieces of interviews, lectures, discussions not used in the lesson tape, for example; or for background material IF it can be given in direct, unproduced ways.

The primary function of the study guide, written by a UW-System faculty member, is to integrate the various audio and print components of the course into a structured learning plan. It may also contain current or topical content not originally included in the text(s). Institutions may adapt, or customize, the study guide by inserting their own introduction and instructions to suit their curricular requirements. For some courses an anthology is developed within the study guide or as an additional component.

Finally, the Administrator/Instructor Guide assists faculty, administrators and support staff, and program coordinators in making the most effective use of the course package. The Guide includes background on the concept of audio, suggestions on ways the material can achieve specific instructional objectives, and the role of the instructor/administrator in planning, implementing and evaluating the audiocourses.

III. Advisory Committees

The Academic Council, appointed by the Dean of General Extension, consists of faculty representatives of the various disciplines within the university system. It establishes the entire freshman-sophomore curriculum for the Project, determines the order of the courses to be produced, and provides the assurance of accreditation for each course. The Council makes the first contact with each academic department to identify the key faculty who will lead the academic team. It continues to offer its advice, and to insure academic input and involvement throughout the entire Project. From the Academic Council, a smaller Executive Committee meets on a regular basis to expedite communication.

The National Utilization Advisory Committee represents those individuals and institutions who may be the users of the Project's products. Its role is to help identify methods to sensitize faculty around the country to the needs of adult distance learners; to advise on the overall effectiveness of the

products of this Project; from a user's perspective to help to insure awareness of other audio projects that are now on the market, in production, or in planning stages; to help to provide entry to consortiums and associations involved in other media-based educational activities; and to advise on the most effective ways to promote this unique product.

IV. Course Design Guidelines

In the classroom, teachers and learners collaborate in the creation of an educational experience. Instructors may use a particular course syllabus repeatedly, class after class, but their teaching of that course content varies as they interact with each particular class. In self-paced audio-print course teaching/learning, the increased distance between the two ends of the "learning-log" precludes spontaneous teacher-learner interaction and the collaborative creation that it might produce. An audio-print course therefore requires prior planning at the teaching end of the log that attempts to anticipate student needs, questions, and difficulties. Designing an Annenberg/CPB audio-print course involves the following activities:

(1) Over-all course planning--course philosophy and objectives: what student will get out of the course;
(2) Lesson planning--12 lessons (specific content and objectives of each);
(3) Planning lesson components--audio cassette, study guide, text and/or other reading materials.

Over-all Course Planning

Planners first address the underlying philosophy of the course--the themes that will unify and give purpose to all lessons, and then translate this philosophy into learning objectives--what the student is expected to gain from the course. Philosophy/objectives provide the distance learner with a context within which to study the content of the course. Addressing this task, planners keep the following in mind:

(1) The national character of this telecourse--teaching team, guest contributors, and students are drawn from the entire nation;
(2) The ways in which this course may be used--
    --as an audio-enhanced correspondence course with UW or other 4-year institution credit;
    --as the foundation of a distance learning course adapted to the credit requirements of a 2-year institution;
    --as a continuing education course without credit;
    --as audio enhancement for a classroom course offered by 2- or 4-year institutions.
(3) Who the students are--academically at introductory level, but probably older and more engaged in adult life than the typical introductory level campus student.
(4) Characteristics of adult learners--eager to put knowledge into practice (even if only the "practice" of meeting course requirements); concerned with relevance of knowledge to their own lives (Why should I care about this piece of information? What is its place in my life? What is its place in my study?).

As a team-taught course, faculty members must consider how they will utilize the particular strengths and experience of each team member. Will each be assigned the lead faculty role for several lessons? Or will each function as lead resource for a particular aspect of all lessons? Do all expect to appear on the audio cassettes, and do they have the ability to project their

teaching excellence in this mode? What will be the contribution of each to development of the study guide? In the development of lessons, who will review and critique scripts and manuscripts?

In summary, these aspects of course planning are addressed early in the initial Faculty-Production team planning meeting:

Course philosophy/objectives
Roles of faculty team members
Selection of text or alternative print material
Availability of text confirmed

V. Lesson Planning

Course content is distributed among 12 lessons; questions with which to approach lesson planning include: What subject matter will it cover? How does it relate to the overall course objectives/philosophy? How much time will students be expected to give to the lesson? What should students get out of this lesson?

For each lesson, planners decide subject matter to be covered; learning objectives (what student should get out of lesson); and assignment of faculty roles and functions. This general lesson planning, combined with activities described in the preceding paragraphs, yields the Course Overview (syllabus) the principal product of the initial planning meeting.

VI. Lesson Component Planning

Each lesson consists of three components: 30-minute audio program, study guide chapter, reading assignment (text and/or other). These components function in integration--do not repeat or merely enrich each other. At the initial planning meeting, as a part of planning each lesson, planners decide how the lesson will be distributed among the three components. Which component will address which of the lesson objectives? Which objectives are most appropriate for which components?

Audio Programs

The audio program delivers those aspects of a lesson that are most appropriate to audio and that cannot be presented as well or better in print. Faculty, writers and producers must consider these questions:

- Which lesson objectives can most appropriately be addressed by audio?
- What specifically do we want students to get out of this program--what are its specific objectives and how do they relate to the lesson objective the audio is addressing?
- How can this audio program make distance learning as or more rich and rewarding than classroom learning? What will be its content? What guest speakers (scholars/experts/artists) might help us deliver this content? What other elements might we use in delivery of this content?

These questions lead to Audio Elements and Formats. In the classroom, the professor presents an active model for utilization of mental powers (investigative, analytical, reflective, etc.) that students are expected to develop as they become "educated." This experience of educated minds in action (except in print forms) may be denied the distance learner.

Therefore, the principal element in audio cassettes is teachers/scholars/artists/experts directly addressing the listening students. Evaluations of previously developed tapes indicate that discussions among scholars/artists/

experts or interviews conducted by scholars usually do NOT yield the most effective elements for audiocourse usage. In such situations, peers interact with peers, and the resulting product is less appropriate for introductory level students--the students feel left out, overwhelmed, turned off. More appropriate material results when an expert speaker is actually addressing students or a surrogate student (the producer/writer, for example).

Audio Workshop

It is imperative that faculty and guests have the ability to project their excellence in the audio medium. The initial planning meeting features a brief audio workshop to instruct faculty in how to adapt their usual teaching/speaking style to the medium. Audio producers assess the voices and speaking styles of suggested guest speakers before making commitment to their use in tapes.

Formats must not be imposed upon content; effective format flows out of content. Therefore, variety of format within courses is both expected and desirable. Further, no "model format" exists that can meet the unique objectives of any particular course in a groundbreaking project like this one.

Audio components must rest upon high standards of both education and audio production. This requirement makes imperative a close collaboration between faculty and production team members. Educational validity and high quality production is further assured by thorough review of audio programs, in various stages of development, by faculty and audio production staff.

Formative Evaluation

The meeting of high standards is also served by a Formative Evaluation of at least one unit in each course. After completing no more than three and possible fewer units, one unit is chosen for evaluation by an outside agent. The results of this evaluation help both faculty and students decide whether modifications are needed in further development of audio and print.

Previous evaluations have produced the following general guidelines related to audio development:

- Abstractions and definitions are not appropriate for audio delivery.
- Each audio program should have its own stand-alone integrity--be a coherent whole constructed around a central theme or thought-line and directed toward a clear objective relevant to the lesson objectives.
- A fundamental axiom of audio communication: Say it more than once in more than one way. Give examples to clarify points and generalizations. Use summaries.
- Voice communication must be high in energy and enthusiasm.
- Teachers/guest scholars should be presented as real and spontaneous people--that is, enough of their personalities should emerge to make students care about them as well as about the subject matter they are explicating. This is of particular importance in introductory level courses.

Study Guide

The study guide is the primary integrating element in the course package. It:

1. Provides a context for the lesson.
2. Ties together audio and print.
3. States the objectives of the lesson.
4. Develops the lesson topic in more depth.
5. Provides a summary of the audio program.
6. Provides a glossary of important terms.
7. Lists suggested readings.
8. Provides questions that guide student listening and reading.

INTERACTIVE BASIC MATH - THE INSTRUCTOR'S ROLE

Mark Marlaire

The Wisconsin Foundation for Vocational, Technical and Adult Education, Inc. has as its primary mission "doing good deeds" for the sixteen technical colleges of the state. The VTAE system provides vocational, technical and adult programs for 438,000 students (58,000 full-time equivalents) each year.

The major problem facing students entering the hundreds of technical programs the system offers is a lack of basic math understanding. Since most VTAE students are often not recent high school graduates, many do not possess these critical skills. The shortage of instructors and class time precludes the individualized instruction that is clearly needed.

The Foundation has been involved in the distribution and production of interactive electronics systems (DC, AC, Semiconductor Devices and Digital Electronics) for the past six years. These courses are in use at over fifty Wisconsin sites and over one hundred other locations in North America. The Interactive Electronics Training System is individualized, self-paced, open-entry and open exit, and has proven to be extremely cost effective.

Because of this experience and the pressing need of VTAE students, the Foundation has developed a new system for teaching basic mathematics -- **INTERACTIVE MODUMATH.** The courseware consists of thirty-nine lessons with an emphasis on understanding and applying math concepts, rather than performing constant drills and practices.

The thirty-nine lessons are as follows:

NAMING WHOLE NUMBERS
THE NUMBER LINE
ADDING WHOLE NUMBERS, PART I
ADDING WHOLE NUMBERS, PART II
SUBTRACTING WHOLE NUMBERS
MULTIPLYING WHOLE NUMBERS, PART I
MULTIPLYING WHOLE NUMBERS, PART II
MULTIPLYING WHOLE NUMBERS, PART III
EXPONENTS
DIVIDING WHOLE NUMBERS, PART I
DIVIDING WHOLE NUMBERS, PART II
WORD PROBLEMS
SOLVING EQUATIONS
PRIME NUMBERS
INTRODUCING FRACTIONS
RE-NAMING FRACTIONS
ADDING FRACTIONS WITH THE SAME DENOMINATOR
ADDING FRACTIONS WITH DIFFERENT DENOMINATORS
SUBTRACTING FRACTIONS
MULTIPLYING FRACTIONS
DIVIDING FRACTIONS
RATIO AND PROPORTION
UNDERSTANDING DECIMAL FRACTIONS
ADDING AND SUBTRACTING DECIMAL FRACTIONS

ROUNDING NUMBERS
MULTIPLYING DECIMALS
DIVIDING DECIMAL FRACTIONS
CHANGING FRACTIONS TO DECIMALS
SQUARE ROOTS
PERCENT
PERCENT IN WORD PROBLEMS
MORE PROBLEMS IN PERCENT
SIGNED NUMBERS
ADDING SIGNED NUMBERS
SUBTRACTING SIGNED NUMBERS
MULTIPLYING SIGNED NUMBERS
DIVIDING SIGNED NUMBERS
SIGNED FRACTIONS
NEGATIVE EXPONENTS

The hardware includes a PC-compatible computer with a 20 megabyte hard drive, an RGB/composite switchable monitor, a Pioneer laser player and a specialized cable. The video portions of the thirty-nine lessons appear on twenty double-sided videodiscs; the instructional material is stored on the hard disk. The only use of a floppy disk is to serve as a key to unlock the recordkeeping system.

In an interactive system like **INTERACTIVE MODUMATH**, the instructor has a crucial, but different teaching role. The student is entered into the system by the instructor, who may make several decisions about the path the student will follow, the standards he/she must fulfill, and the structure of the tests.

If the instructor chooses to exercise no options, the student's first act on the system will be to take the prescriptive test. The test is on the computer, and should take ten to twenty minutes for completion. The computer will assign a lesson schedule based on student performance. This schedule is lock-step; the student must pass a competency test at the end of each lesson before going on to the next.

The actual lesson begins with a clear video presentation of theory, which may be interrupted every one to six minutes by a computer-generated question. If the student's answer is correct, the video lesson continues; if the answer is incorrect, the student will see a video segment or textual explanation that they would otherwise not have seen. As instruction continues, the student responds to detailed questions on the subject matter.

At the end of the lesson, there is a brief review segment. Then the student moves into that lesson's test. Eight to thirty questions, generated randomly from as many as two hundred, determine student competency. If he/she scores ninety percent or better (the passing percentage may be changed by the instructor), the student moves into the next required lesson; if not, he/she is advised to review the lesson and study guide before attempting the test again.

Initially, the instructor and/or prescriptive test determine the instructional program, but it is the student who selects the pace at which he/she is most comfortable, and the instructor who may modify the learning process.

Also provided with the system is WILE -- the Wisconsin Interactive Learning Environment. This provides an authoring script and method for making changes in the ModuMath courseware, and for creating new lessons and courses with any other videodiscs. WILE is an invaluable tool for adapting math or any courseware to the specific needs of the installation.

The Foundation installed thirty-one systems in June of 1988, and encouraged instructor and student use at a very early stage of courseware development. There has been constant feedback from students as young as ten and as old as seventy-five.

Many of the instructors are involved in adult remediation programs such as ABE and GED, but others are from regular math programs. Response has been very exciting, and many changes in the now complete courseware have been made as a result of comments from all these sources.

The intent of this project is to place all math required in all programs at the technical colleges onto one system. Students in each program would be tested for, and scheduled into, the exact math competencies required in their specific program. The level and type of math skills needed by a beautician is very different from those needed by a steamfitter; **INTERACTIVE MODUMATH** will allow each to concentrate on their program needs.

Because the breadth of the math required is so large, the Foundation is seeking the participation of other educational systems in courseware development. The need for such courseware is very clear and, unfortunately, the cost is very large.

INTERACTIVE MODUMATH is a powerful instructional technology that enables an instructor to individualize teaching for a large number of students, freeing the teacher for more counseling and course management.

AN EXAMINATION OF PERCEPTIONS AND MOTIVATIONS OF FACULTY PARTICIPATING IN A DISTANCE EDUCATION PROJECT

Byron R. Burnham, Associate Professor and Evaluation Specialist, Department of Instructional Technology and Extension Service, Utah State University, Logan, Utah.

This study was conducted as an evaluation of the LearnerNet Project at Utah State University. It is an in depth look at teacher reactions to instruction using an expanded syllabus over an electronic system and the effects of such upon faculty members and their teaching.

Because the number of instructors involved was small and because this study describes opinions, judgments, perceptions, and activities of instructors; interviewing and qualitative analysis were chosen as research methods. Conversational interviews were conducted with all but one instructor in the LearnerNet Project. Two additional interviews were held with instructors who taught over the electronic system but were not part of the LearnerNet Project. They served as a comparison group and brought the total number of interviews to ten.

Data from the interviews were categorized into five major areas: (1) teaching techniques and strategies; (2) perceptions about students and their achievements; (3) perceptions about the electronic delivery system; (4) motivations; and (5) other perceptions.

Teaching Techniques

This section describes the course and class session preparation, the instructional intent, and instructional activities of the professors involved in the project. It also offers evidence that teaching in this project affected traditional face to face teaching in a positive way.

The overall course preparation was extensive, resulting in the publication of detailed syllabi which contained explanatory material, review questions, assignments, and points for discussion for each course. These syllabi were well constructed and intended to aid independent learners in a systematic study of specific content areas within the humanities. Various professors made the following observations about course preparation. "I had done a syllabus for this class for three years [in a face to face mode]. But this course required me to work out conceptual gaps". Another professor was forced into heavy course organization. Yet another took a month to develop a textbook-like syllabus. Still another included 20 newly researched articles in his syllabus. These kinds of efforts resulted in courses that were perceived to be "the best thought out class I ever taught" and ones that were highly structured. The interviewees seemed to welcome the chance to think through an entire course in a highly disciplined manner. Course preparation for this project required more effort than a regular on-campus course.

Weekly preparation took longer for these classes than the traditional face to face class. Four to six hours preparation time was reported for distance education classes. This kind of preparation time when combined with consistent system failures caused various concerns for one professor who invested hours of work only to see his preparation time wasted.

Some unique instructional strategies were used in teaching these classes. One professor required students to submit journals. Another "rode the circuit" of remote sites originating lectures from those sites thus, she felt, helping promote interaction over the system. One instructor noted that distance learning forced students to interact with documents and other learning materials more than they would in a traditional class.

Instructors felt as though student/instructor interaction was enhanced by site visits and that these visits helped cut the drop-out rate. While some instructors felt that the frequency of interaction was more in distance education classes than in traditional face to face classes; another instructor felt that students asked questions of him face to face that they did not ask over the system.

An interesting phenomenon was the transfer of distance education techniques to face to face classes. The journal mentioned earlier was used in a face to face class. One instructor noted that in an upcoming sabbatical leave he would develop a course based on his experiences dealing with distance education for a traditional face to face class. Another noted "I felt tremendously under-prepared in my on-campus classes. This course had a very strong structure. I find myself becoming more structured. I used to make outlines on 3 x 5 cards and laundry lists. I feel more uneasy if I don't have that laid out before me than I ever did before." Another developed a sense of what needs to be accomplished on a "week to week basis" rather than a "test-to-test basis".

There was interchange among project faculty some of which was dysfunctional. Six instructors indicated that they had discussed the project among their department colleagues. There was a "kind of passing on the lore". Advice on how to help the students and expected system malfunctions were two major topics discussed. Some instructors were warned of problems that did not occur. Misinformation about the system's inability to convey humor was given.

All of the humanities faculty agreed that their respective subjects could be taught, understood, and felt at a distance. One instructor noted that distance education forces the student to interact with the materials more so than face to face instruction.

Generally, professors reported that their classes are now better planned and organized.

Students and Their Achievements

This section reports professors' perception about the nature of the adults taking their courses and how well they thought the adult student performed. Students in this project were viewed as

highly motivated individuals. Instructors were impressed with student eagerness to learn, synthesize, and integrate new information. The instructors preferred teaching the distant students. This was not due to distance but rather to the students' adult characteristics. Even though two instructors felt that distant students were unprepared and under-prepared for their courses, they noted that they did preform at similar levels of achievement as face to face students. Other instructors felt that the distant students performed as well or better than on-campus students in tests and assignments. One instructor noted that distant students were often mechanically precise" in answering questions and completing assignments. Such students were viewed as not extending themselves or trying new ideas.

The Electronic and Human Delivery Systems

The system is an audio graphic system capable of sending frozen images in black and white at 30 second intervals two ways, plus an electronic writing board and two way audio. The system was rather archaic by today's standards but it is highly cost effective. It has been improved as devices have been improved.

Instructors felt that the system had more potential than was actually realized during the project. One person used the term "medieval" to describe the freeze frame technology. Another noted that the freeze frame and microphone buttons were "deadeners" which inhibited instruction. Some instructors were frightened by the medium, but this fright left after the first few class sessions were experienced. All instructors reported some degree of comfort with the system at the end of the course. The system was initially thought not to humanize nor transmit feedback. But one instructor was pleased to find that feedback could be transmitted. Minimal "air time" may be a contributor to the perceived lack of humanization, because instructors felt pressured to deliver as much content as possible and as a result did not use the time consuming two-way transmission capability of the system. This resulted in lecturing as a major teaching technique and minimized other more humanizing techniques such as discussion and questions and answers.

Problems with the system were generally thought to be with the human side of the system. For example, unskilled technicians contributed to system shortcomings because they lacked a sense of what instructors were trying to convey. The most competent and accomplished instructor could be confined to the campus studio by untrained technicians. Sending and receiving course materials was a problem. Student advisement was thought to be inadequate. And the abrupt cut off of class time without the chance to extend especially interesting discussions was felt to be a problem.

Negative comments dealt with specific technical problems, while positive comments dealt with the promise of educational availability for, heretofore, unserved sectors of society and educational cost effectiveness. One instructor thought it would be like having a two-year college close to home. Another thought the system could alleviate the admissions "crunch" facing higher education. Still another thought it would provide educational

opportunity to people in remote sites and other non-traditional students.

Motivations

Instructors provided different reasons for their involvement. With only ten interviews it is impossible to generalize the motivations presented here to other individuals, however they may form a basis for a broader study of instructor motivations in distance education.

Five of the ten respondents indicated that their motivations were altruistic. One instructor noted that distance education provided educational opportunity for people in remote locations. Another has a long history of extension education and wanted to be involved in a "good idea". Yet another felt "it would mean much to non-traditional students." Still another had an interest in getting his subject matter out to the people. The fifth instructor felt that distance education provided the "ability to serve small numbers of remote sites with the finest instructors."

Three instructors expressed an institutional motivation. One noted that distance education had the potential to "alleviate the admissions crunch." The second felt as thought the specific project provided an opportunity to acquire materials that would last beyond the class. The third responded to requests for certification from students in remote locations.

Two instructors provided a pecuniary motivation. Both mentioned the money involved. Although in each case it was expressed in conjunction with experimentation motivations. One instructor noted that "...it paid. Secondly, I like the idea of the process". The other instructor noted " I enjoyed the subject and wanted to share it".

A final category of motivation might be labeled traditional extension involvement. One instructor noted that he had a "history of extension education", and another labeled himself as an "experienced extension educator".

These motivations provide a basis for additional research. They should be tested and expanded. In effect students were at an advantaged position when compared to the faculty.

Other Perceptions

Instructors were asked if their participation in the project had affected their status with colleagues or administrators. Three did not know. The others thought that because of changes in emphasis of priority of extension and teaching within the university, there would be no effect at all. Their comments show some frustration with the situation as they perceive it. One professor stated: "As near as I can tell, extension does not have the same priority that it has had in the past. I don't think that this experience will count for anything with administrators. I think it may count in extension. I think they have been appreciative of it. However, those people have nothing to do with salary recommendations or with other things that affect me." The other professor stated: "As far as status goes,

as you know, we've gotten a new provost and a new dean, and they seem to be giving us signals to the effect that teaching doesn't count for much anymore, that only research counts. That being the case, no matter how good of a job I did in this course, I don't expect that it will affect my status."

Some faculty expressed a concern for projects that last for one cycle and then are abandoned. This concern exists because of the amount of effort expended initially and because of a desire to improve the project based upon what was learned and what could be profitably changed.

A final observation that should be made is that even though the project courses were a first-time experience for the faculty each quarter, it was not so for the students. Faculty teaching after the first quarter realized that their students were socialized to the system and the project, and they did not need to use as much class time in explaining the structure of the course as did their predecessors.

Conclusion

From the perspective of the faculty, the project was a success. Students learned and generally performed as well as on-campus students. Even though some were under-prepared, their experience and motivation seemed to overcome such shortcomings. The electronic and support systems have limitations; however, they are problems that can be addressed through making some changes. Faculty were generally pleased with the system's capacity to carry discussions, convey humor, and augment directed learning.

The outstanding characteristic of distance education was the amount of preparation by the faculty. Because of limited discussion time and geographical separation, faculty felt compelled to provide highly structured learning experiences. This characteristic resulted from dedication to providing a learning experience that was equivalent to an on-campus five-hour class. This experience with designing a highly structured class has had carry over to on-campus instruction.

Faculty development and production of quality learning experiences were major results from the project. Other results included: providing well mediated independent study courses, collecting audio/visual materials, use of new technologies in delivering humanities courses, and testing the use of and extensive course syllabus with a decrease in meeting time.

A number of questions that lend themselves to research projects have been raised. One is, "Do the characteristics of adult learners play a significant role in student performance?" Another is, "How much, if any, effect does the medium have on class discussions?" Still another is, "What perceptions of the distance education do students have and how do they correlate to faculty perceptions?". Answers to these questions will serve to make distance education more effective.

ASSESSING LEARNER PREFERENCES - A MULTI-DIMENSIONAL APPROACH

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SURGE

The Colorado SURGE (State University Resources in Graduate Education) program has been in existence since 1967 providing continuing education for professional employees of Colorado industries and governmental agencies. In 1972, 23 industrial and governmental facilities participated in the SURGE program. At present, over 30 active sites offer an average of 35 courses serving a total of 400 to 500 students each semester.

SURGE courses are taught by Colorado State University (CSU) professors before a live audience at the CSU campus. The SURGE courses are videotaped and shipped along with printed course materials to SURGE sites at the end of each day's taping. Students at SURGE sites view the videotaped lectures at their convenience and complete the same course requirements as those students on-campus. Faculty provide office hours which enable SURGE site students to call and ask questions or discuss course material.

The candid classroom with telecommunications capabilities involves the learner in a world of technology and an educative atmosphere which may not be the most satisfactory learning experience for every individual learner. The distance learner must contend with the lack of interaction between students and instructor in the candid classroom and the lack of immediate feedback to questions concerning the course content (Wedemeyer, 1962). The pace of the course and style of teaching is determined by the instructor (Rogers, 1977) and the institution. Production techniques, such as close-up shots and focusing on the presentation mode of the instructor, are decisions made by technicians or people operating the cameras and impact viewer reactions (Coldevin, 1979; 1980). The video formats and production techniques which are essential for successful adult programming is a problem to be dealt with in distance education (Walshok, 1980). The needs and requirements of the learners, as users of television and/or video, should be paramount when using technology as an instructional delivery system (National Association of Educational Broadcasters, 1970).

Television has been utilized as a delivery system for learning since the 1950s. The distant learner has taken advantage of the medium of television to pursue education degrees or to update skills needed for continued success or advancement on the job (Gross, 1977; Neil, 1981). How learners respond to this mode of instructional delivery is affected by such variables as socio-economic status, age, sex, intelligence, personality, learning style and characterictics, and teaching

strategies (Coldeway, 1982; Wade & Poole, 1983).

Assessing Learner Preferences

Assessing learning preferences and attitudes toward an instructional delivery system such as videotaped instruction must take into consideration the attitudes, habits, abilities, and personality of the learner as well as demands made by educational institutions and instructors (Entwistle, 1981). Students vary the strategies used in the learning process and individual characteristics impact the way students approach a learning task. Predicting successful learning models requires a holistic approach to assessing student interests and previous knowledge, the varying demands of different courses, and approaches to and outcomes of learning. How students judge or rate a learning experience involves a multi-variable approach to assessment.

The learning style preferences an individual choses are judgments of a learning situation based on different dimensions or cues. As Hovland and Sherif (1967) state "...judgments *are* greatly influenced by motivational and attitudinal factors operative at the time..." (p.236).

Policy-Capturing Method

The policy-capturing method is the process of "capturing" what raters do when responding to stimuli (Naylor & Wherry, 1964) allowing one to predict the actions of the rater from the characteristics of the stimuli the rater is evaluating (Naylor & Wherry, 1965). As Hoffman (1960) reports, the policy capturing method isolates the judgmental policy of an individual and is an advancement over other methods requiring data from groups. "...The policy capturing technique not only attends to the number of dimensions being used, but also attends to the relative importance of each dimension..." (Risinger, 1977, p.35). The policy capturing technique helps to determine the values of an individual through a simulated set of decisions (Mitchell & Beach, 1977).

Learning Models Instrument

The development of the learning models instrument was based on influences impacting the distant learner which were consolidated into five dimensions: sociological, environmental, presentation, professional development, and learning mode. The sociological dimension included descriptors such as large group interaction, interaction with instructor(s), small group or dyadic interactions, and independent study.

The environmental dimension included descriptors such as formal learning environments, mobility, quiet place, comfortable temperature and seating and non-formal settings for learning.

The presentation dimension included descriptors such as an instructor-centered approach, lecture, modeling, repetition/drill, simulations, discussion, and a learner-centered approach.

The professional development dimension included learning situations which provide the learner with professional advancement, upgrading of skills, degree programs, retraining and career development.

The learning mode dimension is described by learning experiences which are mostly listening or watching, reading, iconic or visual respresentations, self-paced or direct experience

The five dimensions, the independent variables, with differing magnitudes simulated a profile of a learning situation model. The magnitude of each dimension, ranging from one to ten, was generated by a computerized random number generator to avoid bias. The desirability scale, ranging from one to thirty, was the dependent variable.

Analysis of the Data

Data from the learning models instrument was analyzed with multiple regression analysis to isolate, for each model, a subset of predictor variables that contribute significantly to an individual's judgment concerning learning style preference. Multiple regression was used to determine the correlation between the criterion variable, the desirability scale, and five predictor or independent variables, the dimensions. Only independent variables with an F value significant at the .05 level of confidence were considered as predictor variables and placed in the standardized regression equations for each participant.

Multiple R, a measure of the magnitude of the relationship between the dependent variable and independent variables, and beta weights, regression weights in standard score equations, were calculated for each predictor variable.

Summary of Findings

1. The cues or dimensions in the thirty hypothetical models are weighted differently by each SURGE student participating in the study (Slovic & Lichtenstein (1973).

2. The dimensions, independent variables, used the most in rating the desirability of learning models were professional development, learning mode, sociological, presentation, and environmental, in decreasing order.

3. The number of dimensions or variables used in the judging the desirability of the learning models was two or three dimensions for a majority of the participants in the study.

4. As the magnitudes of the sociological, environmental, and learning mode

dimensions decrease, desirability of the learning models increased. The finding reveals that SURGE students rate a learning model more desirable when the size of the group diminishes, when the setting is more informal, and when the learning mode moves toward the iconic or visual and self-paced mode.

Desirable Learning Model

The most desirable model was Learning Model Number Twenty-two with a mean rating of 20.9. The desirable learning model indicates the participants in the study prefer small groups, a more informal setting or environment, a teacher-centered approach to presentation with lecture being the primary mode, professional development as an important factor, and preferred a more iconic or visual and self-paced learning mode.

Demographics of the Sample

The sample may be described as mostly male, between the age of 26 and 35 years, has taken approximately four other SURGE courses, has completed a Bachelors degree, and took the SURGE course(s) in the Fall semester, 1987 for professional development and/or as part of a Masters degree. The description of the sample may be partially due to the major course offerings of the SURGE program, which include engineering, business, and computer science courses.

"...If telecommunications is to be an effective educational vehicle for adults, it must integrate with this complex configuration of needs and motivations and not simply facilitate learning at a distance..." (Walshok, 1980, p. 97).

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USING DESKTOP PUBLISHING AND RELATED TECHNOLOGIES FOR THE ENHANCEMENT OF DISTANCE EDUCATION PROGRAMS.

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For the last several years the words ***DESKTOP PUBLISHING*** have received considerable attention in the computer-related press. Even though there has been considerable "public education" concerning the meaning and uses of desktop publishing for a variety of settings, many people are still not acquainted with the reality behind the words and/or are not sure whether or not these words should or could have any significance for them.

This presentation will focus on the use of one certain family of desktop publishing technologies--the **APPLE** family , specifically the **Macintosh** and its associated software and hardware. Discussion will have the following general components: (1) what is desktop publishing, (2) a brief discussion of some of the hardware associated with this type of publishing enterprise, (3) software used for the various elements which are part of desktop publishing, (4) some basic questions which should be asked and answered when contemplating stepping into desktop publishing, and (5) some of the more recent developments which have exciting ramifications for the expanded uses of the basic desktop publishing technology.

Within each of the discussion sections presented above, the emphasis will be placed on what implications each has for the incorporation of desktop publishing and related technologies into distant education settings.

As part of this presentation, slides will be shown which were produced on a Compacq using a software graphics package marketed by Harvard Graphics and a Polorid Pallett. Handouts for this presentation were produced using Word (Microsoft). In the book, *The Art of Desktop Publishing*, the authors describe how they produced it:

> We used an Apple Macintosh computer with Word (Microsoft), and PCs and CP/M computers with WordStar (MicroPro), to write and edit the chapters. On a PC we used Index (Digital Marketing) to produce the table of contents and index, and dBase II (Ashton-Tate) to produce the list of companies and products. On a PC we checked the spelling and punctuation using the Word Plus and Punctuation and Style (Oasis Systems). Finally we transferred the text to a Macintosh in order to use JustText (Knowledge Engineering) and the Apple LaserWriter to produce pages. We then substituted an Allied Linotype Linotronic 100 typesetter for the LaserWriter, and ran JustText again (after making final editing changes) to produce the camera-ready typeset pages. **(Bove, Rhodes, and Thomas, p.XIII)**

The examples given above show the relative ease with which various desktop publishing systems can be incorporated into the production process. Although this presentation focuses on the APPLE system, the author will show the way networking with other systems can be accomplished. In this author's view, the Macintosh still has the edge on its competitors, especially in terms of graphics and user friendliness. However, frequently, for a variety of reasons, implementing the use of a Macintosh requires communication with an existing PC and/or CP/M computer. To realize the benefits of the Macintosh, a current in-place computer network does not have to be replaced. Discussion will show how communication between various computer networks can be accomplished.

Recent development of HyperCard, and the continuing development of technologies like CD-ROM have fascinating potential applications to distance education programs. Another area of recent development with potential application to distance education is the "desktop V-Editor. As a means to enhance and extend instruction, educational programs are employing a variety of media. One medium whose use is increasing is the video tape. There now exits the technology which will turn a desktop publishing system into a "desktop video editing" and enhancing system. Using a system like this could provide the means of producing good quality video-lessons for relatively low cost. Increasing the use of video in the design of distance education courses could be extremely beneficial in terms of marketing.

The exploration of the possible uses and implementation of desktop publishing as a means to lessen pre-publication costs for a distance education program will be the start of what the author hopes will be a lively and thought provoking discussion. Examples of the end-product of the technologies under discussion will be available. There will be several handouts giving a list of a variety of different resources for the person who wants to continue to explore the possibilities of enhancing a distance education program by using desktop publishing and other related technologies.

This presentation is for the desktop publishing neophyte. The level of the discussion will be at the introductory stage with an assumption that the participants' computer technology awareness in this area is just beginning to develop.

CHANGING ROLES OF TEACHERS AND ADULT LEARNERS IN A NON-CREDIT DISTANCE EDUCATION FORMAT

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Introduction

As K. Patricia Cross (1981) noted, adult learners are continually faced with barriers to participation in credit and non-credit educational programs. These barriers include: situational barriers such as limited time and/or money to attend educational offerings; institutional barriers such as inconvenient location or scheduling of the educational program; and dispositional barriers, e.g. feeling too old to learn, lacking the confidence to 'compete' with other students. For certain educational content, potential learners may face yet another barrier - the need for anonymity in their pursuit knowledge and/or skills. Examples might include the illiterate who chooses not to identify him/herself as a nonreader or the individual in financial difficulty who prefers that others not know his/her plight. Distance education programs have helped many adult learners overcome situational, institutional, and dispositional barriers and have afforded many an element of discretion . "Using Credit Wisely" is one such program.

The Educational Program - "Using Credit Wisely"

This non-credit audio- and print-based learn-at-home educational program was piloted in four rural northern Wisconsin counties during 1987-88. Specifically the "Using Credit Wisely" program was targeted at young families (individuals and marrieds) 18-45 years of age in the beginning and expanding stages of the family life cycle who are using or plan to use consumer credit. A distance education format was selected as evaluation of previous University of Wisconsin-Extension programs show that young families prefer to receive their adult education programs by a means that permits them to learn at their convenience at home. (Boelter and LeFebvre, 1984; LeFebvre and Kempen, 1985) Further, other studies that examined how people prefer to learn money management show that individualized learning by mail was preferred (Yogerst, 1985).

On enrollment in this particular distance education program, learners were asked to indicate their priority needs related to credit management. Based on these self-identified needs, the learner then received the appropriate set of lessons, i.e. audio tapes and related print-based narrative and worksheets. These lessons included the following:

"Evaluating Consumer Credit Decisions" - lessons designed to help learners make decisions about the amount of credit they could afford and how to use installment credit and credit cards wisely;

"Managing Your Credit Load" - lessons to help the learners manage credit through a spending and savings plan; and

"Resolving Consumer Credit Problems" - lessons are designed to help learners resolve problems they encounter in the use of consumer credit.

Through this non-linear program design, learners were able to choose the lessons that fit their needs and were able to receive as many additional lessons as they desired in the order deemed most appropriate by them.

The Changing Role of the Educator

Developing, delivering and evaluating the distance education program "Using Credit Wisely" effected changes in the role of the educator and the educator's support staff. An essential feature of distance education is that the teaching acts are separated in time and place from the learning acts. This requires an understanding of the learner, including especially his/her entering knowledge and possible issues and concerns which might arise as individuals work through the educational program. Given the amount of lead time to secure grant funds, necessary in this instance, outline content, script and record audio-tapes, consult with production personnel of all varieties, develop evaluation strategies and complete assembly of materials, the time from inception to delivery can be lengthy - in this case 1 1/2 years. Fortunately concerns regarding credit are fairly universal and continual, thus these materials were and continue to be timely. Length of production however does need to be given consideration if programs speak to a specific issue or concern of a potential short term nature.

With a class or workshop with a specific beginning/ending date, marketing becomes a one time event for the most part. However with a distance education program available over a long period of time, marketing strategies were necessary for an extended period of time. Consideration of a variety of marketing strategies, sequencing of promotion and specific content of promotional efforts needs to be carefully considered. In addition the target audience for the program must be clearly specified to ensure appropriate enrollments, e.g. level of debt within the scope of solution through education in the case of "Using Credit Wisely."

Another major area of change was the management of each learner's enrollment. Not all students enrolled at the same time. Not everyone who enrolled had the same needs. What is required is a tracking system to chart the progress of each program participant and his/her special needs, etc. Utilizing a computer, personal information on each student, his/her progress through each lesson and correspondence with the learner was available for instructional decision making as necessary.

Keegan (1988) has noted that "carefully developed distance teaching materials often fail because they are developed for and dispatched to students who do not open them or who open them but do not study them, or who study them and do not reciprocate in any way." (p. 7) In an attempt to minimize these occurences a series of prompts was developed. These prompts (personalized letters) were intended to both add a personal touch and increase completion rates. Interestingly enough, few individuals recalled receiving the prompts, with the exception of those individuals who had failed to begin or who were making limited progress in working through their self-selected lessons. One might hypothesize that in instances where learners are highly motivated the prompts have no effect on their progress so create little impression. For those making little progress the prompts serve to reconstruct the moment in which the teaching-learning interaction occurs - to reintegrate the act of teaching which is divided by the nature of distance education. (Keegan, 1988)

In addition, the prompts reaffirmed the availability of support from the extension home economist, communicating concern for the student's needs during the learning process - communication which Moore (1986) considers to be crucial to the effectiveness of distance education.

Effectiveness may be defined in a variety of ways. In an attempt to assess the effectiveness of "Using Credit Wisely" from a learner perspective a number of 'after lesson' evaluation forms were to be filled out by participants. Responses were uneven at best. In addition, a more extensive evaluation was conducted 6 months after the program's inception. A random sample of participants were sent a mailed questionnaire and a similar number randomly selected were telephoned and asked questions identical to those on the mailed questionnaire. The use of both methods to elicit information was in part to assess response rate for future direction for evaluation. Less than 20% returned the mailed questionnaire, all interviewees consented to participate in the evaluation. Thus it seems another possible role for the educator or support staff may be conducting telephone interviews for evaluation purposes. Transcription of interview tapes and/or the creation of a data base for statistical analysis also seems necessary if exactness of data is important for reporting purposes.

Needlesstosay the impact on support staff of a lengthy production and marketing period, continual enrollment, establishment and maintenance of a learner tracking system, the frequency of correspondence with learners and the implementation of an evaluation schema is considerable and needs to be given serious consideration by educator and support staff alike.

The Changing Role of the Learner

The learner participating in "Using Credit Wisely" also may experience changes in roles and may require the learner to employ a variety of skills used in a limited fashion in the traditional face-to-face classroom. Learners initially are asked to specify what it is they wish to learn (within the confines of credit management) - freedom to chose their learning objectives. Further, the learner has the independence to select the learning activities - including the sequencing of lessons and the use of audio or print media, also determination of which, if any, worksheets to fill out and which print narrative or bulletin section to read, repeat or reject. In essence the learner has a degree of independence as defined by Garrison (1987) in the distance education process.

Follow up interviews with program participants failed to isolate any concerns with making the decision to participate in "Using Credit Wisely" or lesson selection. In addition, those learners who were successful in working through the program to the extent they desired spoke confidently of selective use of materials, determination of which sections to repeat for clarity, and their decision to complete all, none or some of the lessons.

Another unique role for the learner is the taking of responsibility for the learning process itself. Garrison (1987) noted that power or ability to take responsibility for the learning experience requires more than the intellectual ability. It also requires incentive to learn, self-confidence and skills with

which to approach, maintain, and complete a learning program. Follow-up interviews failed to isolate learner problems with intellectual ability to handle the educational program when asked directly about changes that might be made to make educational program more useful to themselves or their peers. Only two individuals suggested language level and concepts were too difficult, and the reference to degree of difficult specifically referred to future use of "Using Credit Wisely" with a group of educationally disadvantaged individuals.

Where learners appeared to have the greatest difficulty in their new role as an adult independent learner responsible for their own learning was in the area of skills to begin, continue and complete a distance education program. The difficulties revolved around the following areas: getting started; finding a sufficient amount of time to pursue studies; being unable to identify a study space and establishing the "Using Credit Wisely" educational program as a priority in their lives. Interviews with more than 20% of the participants failed to isolate one individual who had not self-selected into the program, so one might assume a high level of internal motivation. Further, on preliminary analysis these participants consistently suggested they preferred educational experiences where they were able to work alone, make decisions on what to study, had logical clearly organized materials with assignments and activities in a sequence seemingly suggesting that they had self-selected into a learning program which best matched their learning preferences. However even with this match and internal motivation, a large portion of the learners were unable exercise power over their learning.

"Using Credit Wisely" was developed not only to help individuals evaluate their credit decisions, but also to manage their credit load to meet their credit obligations and resolve credit problems they encountered. What becomes apparent in reviewing evaluation data is that a number of individuals have had difficulty moving from knowledge gained and reflection on their personal situation to the point of taking action on their own behalf or for some these practice changes appear to take some time to become operationalized.

Implications and Conclusions

The development, implementation and evaluation of a non-credit distance education should not be undertaken lightly. While the delivery of educational programs at a distance permits potential to overcome a variety of barriers, the educator, his/her support staff and the learner will experience a number of role changes.

The educator must give serious consideration to the amount of lead time necessary and the appropriateness of the content to be conveyed (time sensitive issues and concerns may require less time intensive production modes.) Where continual enrollment is possible, both targeted marketing over an extended period of time and the establishment of a tracking system to follow learners over a period of time must be considered. In addition, prompts or correspondence to encourage progress and completion appear necessary for at least a portion of participants. As Holmberg (1986) has noted learners could be asked if and to what extent they would like support. This might minimize the volume of correspondence and other communications. Meaningful evaluation may require time consuming interview processes in order to ensure representative data.

The educator must also be aware of the need to incorporate 'learning how to learn at a distance' hints not only at the beginning of the educational program but throughout. Providing guiding comments to help learners through certain sections may be of assistance in maintaining progress. Additionally, where learners indicate an interest in support and communications, learners might be paired, a network of learners might be established, or a cadre of volunteer peer tutors could evolve to make support and guidance less staff intensive.

Particularly in financial management programs such as "Using Credit Wisely" potential learners and referral agencies need to clearly understand the nature of the program and the potential outcomes. For individuals whose financial situation dictates the need for counselling, an independent learning program may only serve to further discourage. Learners who choose to participate need to recognize from the outset the nature of the educational program and their roles and responsibilities within the program. Taking initiative and responsibility for their own learning will be vital to their success. In addition, moving from reflection to action requires commitment on the learner's part. Recognizing that changes in practice do take time, educators must be cautious not to evaluate for practice change to soon - often leading to the appearance of a less than successful educational effort and discouragement on the part of the learner for not accomplishing as much as some would expect.

In essence, the benefits of developing, implementing and evaluating a distance education non-credit program long outweigh the costs, but the undertaking must be carefully considered by all given the impact on the roles and responsibilities of those involved.

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CONFERENCE ON TEACHING AT A DISTANCE
August 3, 1988

"Saving Food Dollars": Development and Evaluation of an Interactive Videotape Package for Hmong (Indochinese) Audiences

Presenters: Kathryn F. Smith, M.S., Manitowoc County Extension Home Economist, University of Wisconsin-Extension

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Overview of Presentation

The goal of the "Saving Food Dollars" project was to develop an interactive distance education program utilizing videotape technology and print resources to teach food and nutrition information to Hmong Indochinese refugees living in the United States.

The project began when Kathryn Smith, Manitowoc County Home Economist became aware of the educational needs of Hmong refugees in her community, and the Wisconsin Expanded Food and Nutrition Education Program (EFNEP) made available funds for innovative nutrition education projects to Extension Home Economists. Ms. Smith and Karen Dickrell, Kewaunee County Home Economist wrote a proposal, which was funded, for the development of four interactive videotape programs for Hmong audiences. This presentation will review the development, evaluation, and implications of utilizing distance learning technology with a refugee audience.

Characteristics of the Hmong refugees audience

The "Hmong", (meaning "free man") are a minority group who lived in the northern, mountainous region of Laos in Southeast Asia. Their society was primarily agricultural, and they lived in large family groups, or clans. From 1960 through 1975, thousands of Hmong soldiers fought in the CIA-led "secret war" in Laos for the United States; many perished. The Hmong began to flee Laos in 1975 after the American withdrawal from Southeast Asia; many suffered during dangerous flights into Thailand and others have remained in Thai refugee camps for up to twelve years waiting for resettlement to other countries - primarily the United States.

Approximately 178,000 Hmong refugees resettled in the U.S. between 1975 and 1987; the largest number reside in California, followed by Wisconsin, Minnesota and other states. Ten Wisconsin cities are home to over 13,000 Hmong refugees.

Factors which make educating Hmong refugees a complex process include the following:

-The lack of a written Hmong language until the 1950's. (Most Hmong do not know how to read and write Hmong.)

-A high rate of illiteracy in refugee women and children because of the war's disruptive effects.

-Differences between Eastern and Western cultures (including beliefs and practices about health.)

However, the Hmong put a great priority on the value of education; and want to learn, get off welfare, and make a significant contribution to America. (Indochinese Resource Action Center, 1988).

Assessment of Hmong Adult's Nutrition Education Needs

Because of the differences between Hmong and American culture, the following approaches were utilized to determine the educational approach and materials to be utilized:

-A Hmong advisory committee, composed of Hmong individuals from the Manitowoc, Wisconsin area was formed. The committee gave input concerning their educational wants and needs.

-Several Hmong interpreters were utilized throughout the project; their input on determining educational concepts and handouts, as well as performing translation work was essential.

-An advisory committee, composed of Wisconsin Extension Home Economists with Hmong clientele, an Extension evaluation specialist, a PhD student who had worked in a Thai refugee camp, and the project team was formed.

The committee brought input from Hmong community leaders and professionals assisting refugees on the county and state level (including the Special Supplemental Food Program for Women, Infants, and Children (WIC), Wisconsin Refugee Services Program and the Wisconsin Vocational Technical Adult Education Program) State WIC Program staff input was especially helpful as we were informed each county WIC site had purchased a VCR and monitor for group classes.

Once it was determined the Hmong population in Wisconsin desired more information in the area of foods and nutrition, a review was conducted of educational materials developed for the population in the United States. We discovered there were some written materials available, but very few audiovisuals. (The only food-related videotape program for the audience had been recently developed by the University of California-Extension; it was not interactive in nature.) We also reviewed the information available on food habits and practices of the Hmong.

Literature Review

Literature in the following areas was reviewed; several conclusions pertinent to the Hmong videotape development include:

*Hmong learning style - conclusions from a study which examined the learning of a group of Hmong adults were:

-Hmong adult students' interpretation of their role in classroom work is to participate in cooperative group activities. Their learning style is cooperative in nature (rather than the competitive nature of many U.S. activities).

-The adults worked best when directions are explicit and concrete examples are utilized.

-An informal, non-rigid environment in which group interaction is encouraged was preferred. (Hvitfelt, 1986).

*Guidelines for Developing Nutrition Materials for Low-Literacy Adults (Nitzke, et. al., 1986)

-Repeat important points to increase learning retention

-Include "how to" information

-Give examples using foods named as acceptable by the target audience

-Use active voice and direct, positive statements (rather than passive voice and complex, negative sentences)

*Effectiveness of Video Program Teaching

-Programs should be interesting (not necessarily entertaining or elaborate)

-Utilize short segments (less than 10 minutes) with breaks for activities

-Actively involve the learner

-Make sure the video and audio portions of the program are consistent

-Nutrition knowledge can be positively changed with videotape instruction, particularly when utilized with other learning activities and discussions (Travis, et. al., 1984; Byrd-Bredbenner, et. al., 1988).

Videotape/Written Material Production

Before production on the Hmong videotapes began, a home economist, Faye Malek, was hired to write the script and accompanying written materials, work with interpreters, and coordinate the efforts of the video production company. The project team then produced a short "talking heads" videotape on the topic of 'Making Baby Food' and tested it with a limited income audience. Results of the evaluation were encouraging; participants viewing the videotape had greater increase in knowledge than those watching a "live" presentation!

Based on a summary of advisory group and literature review data, the project team selected the content areas of food shopping, selection, and storage for the programs. The series title "Saving Food Dollars" was chosen; the four interactive programs are titled "Knowing What to Buy", "Buying Fresh Foods", "Making Good Food Choices", and "Deciding What to Buy." The team also decided to produce the videotapes using primarily Hmong actors and make available two versions of the tapes; one in English, the other in Hmong. (Written materials would be developed primarily in English with a few Hmong words.)

A consumer decision-making model, adapted by Nan Baumgartner, Fond du Lac County Extension Home Economist, was utilized in the development of videotape/written materials content. The model stresses that individuals progressively move through he following steps as they make decisions:

1. Identify the need

2. Identify the alternatives

3. Weigh the alternatives

4. Make the right decision

5. Carry out the decision

6. Evaluate the decision

Therefore, the videotape programs were developed to provide progressively complex information based on the model.

The videotape scripts were then written by Ms. Malek, and reviewed by the advisory committee, project team, and University of Wisconsin-Extension specialists in Madison. After repeated rewriting of the scripts, they were finalized, and the Hmong translation work began. Several individual trasnslators were utilized, and ultimately a group of Hmong individuals cooperatively completed the translation work.

After a review of equipment costs and services available at several businesses, a commercial videotape production company was chosen to complete the project. The programs were shot in local grocery stores and in the home of one of the home economists. Editing of the tapes was a more lengthy task, and Ms. Malek was closely involved in this process.

Written material development followed a similar process; Ms. Malek wrote a teaching outline and learner activities to accompany each videotape program which were revised upon review by project and committee members. The teaching outline is written in a "What to Say"/"What to Do" format, which gives the group leader content and activity information, as well as the lesson objectives and materials needed. Two activities were written for each videotape program activity; one is to be completed wilth the audience during a break in the videotape; activity two is designed for the conclusion of eacn program.

Videotape Evaluation

Several evaluation instruments that have been developed and are being utilized with various Hmong audiences are as follows:

-An instructor's evaluation form which includes information on how they utilized the programs and their opinion of its effectiveness. The questionnaire also measures the instructor's opinion of the teaching outline and participant handouts.

-An interview form utilized as a verbal post-test with a sample of each audience. The instrument lists knowledge and behavior questions supporting the program's objectives and content.

-An observation evaluation form to be utilized by the project team to evaluate audience response to the videotape and participant activities.

Initial evaluation results are very positive; observation results indicate Hmong adults listen intently to the videotape program and are pleased materials were developed in their language. Several sizes of groups have seen the program; smaller groups (less than 15 adults) appear to be more conducive

to the learning process.

In the smaller group, all members of the audience participated in the activities and program discussion. The larger group made interaction more difficult. In verbal interviews and other comments by participants, Hmong adults stated they were (or were planning on) utilizing practices recommended in the videotape program, such as using a food shopping list. Participants also appear to understand the content present in the program.

Findings and future program implications

The project team is encouraged by the apparent success of the interactive Hmong videotapes, and so are presently developing a series of four interactive programs for limited income American homemakers on the topics of using fruits, convenience foods, low-cost meals and the dietary guidelines. We also anticipate making the videotape programs and written materials available nationally in the near future. Finally, a new EFNEP project has been approved which will include utilizing the interactive videotapes in a series of classes for Hmong homemakers.

The project team is enthusiastic about the effectiveness of interactive videotapes with a Hmong refugee audience. We recommend American educators become aware of Indochinese individuals' content needs and utilize distance learning technology to meet the needs. In addition, we recommend the development of high-quality (not necessarily expensive) videotape programs and written materials for maximum effectiveness and acceptability.

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CONDUCTING SUCCESSFUL MULTI-HOUR TELETRAINING

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The use of audio-teleconferencing for training purposes is a relatively new concept with widespread usage occurring in the last 25 years. As with any new concept, there soon developed a set of assumptions which in turn led to guidelines and ground rules which have provided the operating do's and don't's for the conduct of training via the medium of audio-teleconferencing. One of the often stated assumptions of audio-teletraining is that to be effective, teletraining programs should be relatively short in duration - that is 60 to 90 minutes in length. This assumption, based largely on anecdotal evidence and personal observation, was reinforced by research studies regarding how long people in learning situations can maintain a level of attention sufficient for effective learning. It is our observation that the research on attention spans for effective learning is correct, but that as applied to audio-teletraining it has been misconstrued and therefore misapplied.

In the Veterans Administration's Department of Medicine and Surgery, teletraining has traditionally followed the tried and true guidelines regarding audio-teletraining. However, a serendipitous event occurred which has led us to systematically test the assumption regarding the duration of effective teletraining. A unique training opportunity presented itself but had to be accomplished as a day-long teleconference. The evaluations from this teletraining program were overwhelmingly positive with some participants being willing to stand or sit on the floor in the back of the room for up to six hours. A deeper look at the evaluation data indicated that virtually none of our worst-case fears of teletraining - boredom or burnout - could be identified. Subsequent to this, we have conducted many multi-hour teletraining programs and have examined in detail a series of eight-hour teletraining programs, six hours of which were on line.

Our experience indicates that it is both possible and appropriate to conduct multi-hour teletraining. We have also learned that there are certain factors to which much attention must be paid. It appears that these factors, rather than duration of the teletraining program, determine the ultimate value of the learning experience. The following three general categories encompass the relevant factors. They are:

* Content Selection
* Teletraining Instructional Design
* Interaction Management

Content Selection is a particularly important factor in the success of multi-hour teletraining. The learners must perceive the content to be of high value to themselves - addressing skills or knowledge that they must possess in order to successfully do their job or enhance their

employability. This of course implies that the proper audience was identified and that their learning needs were well understood. Additionally, the content for multi-hour teletraining must lend itself to active involvement on the part of all learners. It is unlikely for instance that a topic which is essentially information sharing will meet the above-mentioned criteria. Problem solving, wherein the learners are involved in developing and sharing the solutions, is an ideal learning situation. The more real the problem is to the learners, the more potent the learning experience.

Teletraining Instructional Design is an absolute must for multi-hour teletraining. The design of the program allows one to factor in the pluses and minuses of the teleconferencing medium in addition to what is known about the design of instruction to assure that maximum learning is realized. While the same basic instructional design principles apply as for short-duration teletraining, special attention must be paid to learner-faculty interaction, the learning materials necessary to support the program, and the specific activities which engage the learner in an active learning process. This implies using the knowledge we have about the medium of teleconferencing, and learning to structure, sequence, and manage the learning experience.

Managing interaction among the participants involved in interactive audio-teletraining, is another ingredient which is of special importance as the length of the training session increases. The moderator and faculty, who essentially control the teleconference, must create a stimulating but supportive environment in which all learners can achieve the desired learning outcomes. A number of specific techniques described in Bridging the Distance, such as, humanizing and participation are the basis on which good interactive teletraining is built. However, as the duration of teletraining increases additional techniques are needed. An interaction monitoring device enables the moderator and the faculty to see interactive patterns develop so that they may be modified if necessary. For instance, selective, direct and personal questioning can be utilized to modify an undesirable interacive pattern. We have coined the term "ear balling" to refer to the moderator's and faculty's ability to perform formative evaluation by listening between the lines to determine whether or not desired learning is occurring. For instance, what is not said may be more important than what is said! Another important facet of the interaction is the appropriate use of facilitators at each learning site in a teletraining program. Employing the facilitators as the eyes and hands of the faculty at the various learning sites is of crucial importance.

In a nutshell, effective multi-hour teletraining is not fundamentally different than any other effective training. That is, learners must be identified and their needs must be understood. This understanding plus a knowledge of the teleconferencing medium provide the basis for the instructional design. A climate which enhances the opportunity for learning must be created. Learners must be actively involved in the learning process, and a means must be employed which enables the faculty to determine, while the session is in progress, if desired learning is occurring and to provide meaningful feedback to learners. Accomplishing the above requires the understanding of the teleconferencing medium and the application of specific techniques at each facet of the process.

An Integrated Approach to Serving Professionals with Graduate-Level Distance Education

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This presentation describes an application of Training/Continuing Education. Information is provided about the practice of offering on-going graduate level coursework, at the Master's Degree program stage, to students enrolled in the educational leadership program at the University of Alaska Fairbanks. Such practice is typical on many campuses. What makes this program different is that the students live across a 300,000 square mile area and take much of their coursework through an innovative distance teaching mode of delivery.

This delivery system uses an integrated technology approach. The course outlines, appropriate background information, textbooks and related readings are mailed ahead to students. This "curriculum packet" component is modeled after the Australian system of using massive amounts of print material and transmitting it by the mail. This curriculum component includes essays, worksheets, "in-basket" materials, bibliography information and "suggestions for student reflection". The Alaskan system does not end with the mail correspondence, however. There are a number of other components to the system.

Every two weeks the entire "class" gathers by audioconference to discuss the materials which have been mailed ahead. Not only do students receive the "curriculum packet" two weeks prior to the beginning of the semester, they receive a constant "stream" of handouts as the course progresses. These handouts may include copies of speeches, article reprints or simply instructional letters and/or notes. Often, the material to be discussed in an audioconference includes a video tape which the students will have received approximately ten days prior to the conference. Sometimes the class discusses the content of audiotapes which circulate between instructor and students.

Video and audiotapes have special merit within this innovative distance delivered course. Scholars, writers, authors and/or persons in the spotlight of current attention can be invited to produce a videotape wherein they articulate a point of view or

create a discussion starter for an upcoming audioconference session. Also, commercially prepared videotapes (used with producer permission) add greatly to the interest level of the course. Even in the most remote Alaskan village setting, students have access to a VCR. So, videotapes become a mainstream of this distance delivery system.

Audiotapes are especially helpful. In addition to providing the more typical lecture material, tapes can be used to transmit panel discussion sessions and campus-based forum meetings. The most unique and extraordinary use of audiotapes, however (in this distance delivery setting), relates to the way that these tapes provide for the medium of two-way communication. At the University of Alaska Fairbanks, we use audiotapes to "voice communicate" with our students and they use the same audiotapes to "voice communicate" with us. Often, we'll transmit a brief ten minute series of questions and discussion starter information at the beginning of an audiotape. The student then, on receipt of the tape, will send back a response, with perhaps another set of questions and discussion starter material. It just goes round and round between instructor and student!

In between the audioconference sessions, other communication modes are used. The students are linked with one another and with the instructors on the Fairbanks campus by way of a computer mailbox system. This system speeds messages and course materials back and forth between the students' homes or workplaces and the University. We have found that, while every student does not have access to a computer terminal, most students are able to gain at least indirect access by way of mail relay from school district or village government headquarters buildings.

One further component of this integrated distance delivery approach deserves special comment. Instructors maintain evening office hours when students can call in with their questions and concerns. We have discovered that even the most remote sites now have telephones (or radiophones) available for student use. There may only be one telephone in the village, but our students can gain access to it and can "reach out and touch someone" just like the city folks do!

In conclusion, a few remarks are called for regarding the reasons we are so pleased with this system at the University of Alaska Fairbanks. First, this system has enabled us to provide an excellent educational program for students who would have otherwise been unable to gain access to such a program. Distance and geographic isolation factors would have prevented access to this fine program for many Alaskan students. Now all Alaskans can

participate in this excellent training and continuing education program. But, of equal importance, this innovative distance delivery program has made it possible for students and instructors to interact with one another on a very personal level and across great distances. We have removed the distance barriers and we have introduced close personal associations to the distance delivery of graduate coursework! We are pleased with this accomplishment.

This integrated system works exceptionally well in Alaska with all of our distance and geographic challenges. It is the belief of this presenter that the system could be utilized in other states and regions as well. Questions regarding unique applications and special considerations are invited and encouraged. For further information regarding details of this program write: David Hagstrom, College Station Box 8-3434, Fairbanks, Alaska 99708.

Student Support Services for Videoteleconferencing in Nursing Education

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Student Support Services for Videoteleconferencing in Nursing Education

Introduction

The rapidity of changing technologies and learner demographics in todays' world mandates the consideration of alternatives to traditional classroom instruction. The number of college bound eighteen year olds is declining, but there is an increasing number of potential older students.

The current situation in nursing has created a new type of learner with different kinds of educational needs. Professional organizations have adopted the position that the Baccalaureate degree in nursing should be the entry level requirement for the professional nurse and there is also a nursing shortage. This means that nurses prepared at the associate degree (2 years) and the diploma (3 years) level of nursing education have the best of worlds. They are in demand and education is valued for them. On the other hand, if they have family and work commitments, going to school may be difficult. Nurses who have earned the BSN degree and want to begin to earn the MSN degree constitute another population of learners and more nurses are earning doctoral degrees. This diverse population is likely to be older and have been away from the learning environment for some time. Distance, work, and family responsibilities are frequently hindrances to going to school for them. If educational opportunities are not available for these nurses in their own geographical areas, they often do not pursue educational goals. Videoteleconferencing can be the solution for these nurses if technology, support services, and quality instruction can be arranged. The excitement and involvement in providing learning opportunities for such nurses who vary widely in age and experience is well worth the effort that it takes for videoteleconferencing or "TV classrooms" to occur.

Student Support Needs for TV Instruction

1. At reception sites

   Information about programs/courses
   Registration/enrollment information
   Classrooms that are private and comfortable with desks or tables
   Television monitor wired to the appropriate system
   Telephone to contact the studio or sending site
   Resource person to secure and monitor tests and coordinate library requirements

2. At the originating studio or sending site

   Competent, caring faculty
   Competent production crew
   Technology required to send the signal
   System for sending/coordinating class materials
   System for overseeing all aspects of the project

3. Other

   Family support
   Employer support
   Peer Support

Student Rewards

Nurses who thought that they could never earn higher degrees because of family responsibilities or limited access to education sometimes find that learning by TV is its own reward. Nurses who wish or are being pressured to go to school for advances in responsibility and pay find TV classes a viable option. Sometimes the lives of nurses are changed and their career directions are drastically altered by the opportunity to go to school. When these things happen, it is very satisfying for those who are trying to develop a system of TV instruction for them.

Limitations of TV Instruction

Many things can go awry at televising time in live telecasting despite the best planning. For example, students at reception sites may not have the TV equipment plugged in correctly, the monitor may be on the wrong channel, or classrooms may be locked so they cannot get in the room on time. When such things happen, students tend to overreact initially. Sometimes the weather is a culprit, in rainstorms the signal does not always get through from the sending site to the reception sites. Sometimes students at reception sites do not like relating to a "talking head" on a TV monitor as a teacher. Conversely because students in the studio <u>are</u> accessible to a "live" teacher, they sometimes feel that they are called upon more than their unseen peers at distances. Despite limitations of this nature, students at distances appreciate the opportunity to take classes for credit to reach their goals.

Modifying Classroom Activities to TV Teaching

TV instruction in higher education is approached differently than the use of TV for commercial or entertainment purposes. This does not mean that classes have to be dull in format or that students minds cannot be challenged. Neither has to be true in TV teaching and the best features of the medium can be used to enhance classroom instruction. For example, the character generator or "chyron" can be used for the lower third of the TV screen to identify a speaker or full screen for lists of information and it is colorful and attention getting.

Blackboards or chalkboards do not show up well with TV and it is not possible to use transparencies with an overhead projector on TV. A modification for both purposes is the use of a fixed 11x12" white glass screen that can be written on with colored magic markers and erased with an ordinary eraser. Transparencies can also be used on this device. Both are photographed with an overhead camera and projected on the TV monitor by production crew in the control room upon faculty request and televised to reception site classrooms.

Other types of learning strategies such as posters or slides and learning formats such as interviews or panels are easily accomplished in TV teaching. The use of camera zoom can be very effective in any of these strategies. A faculty member droning facts can be as deadly in TV teaching as in traditional classroom teaching.

Faculty who have never taught on TV before are intimidated and dubious initially. For some, the attached microphone inhibits movement and they feel constrained. If they can see themselves on the TV monitor, this can be disconcerting initially. If the faculty member is comfortable with the course content, however, he or she quickly adapts and becomes as comfortable in a TV studio as in a traditional classroom. Some even become "hams" in TV teaching.

It takes some time for faculty members to become accustomed to being observed by the production crew members who are not taking the course for credit and who are not necessarily entertained by the class. It is worth the effort to develop a close relationship so that the production crew members are motivated to support faculty by anticipating or responding to their cues. The faculty and crew members can work in concert and their best efforts are reflected in the high quality of the production. It is possible for the faculty, students, and production crew to be highly creative in the TV classroom and to enjoy themselves in the process. It is also possible to videotape the class session to retain in a library or send to students who must miss class because of an emergency.

Much planning is necessary in TV teaching prior to the first class session. Textbooks must be ordered on each reception site, recruitment and registration of students must occur, syllabi and class materials must be sent to students. The production crew needs an outline of how each class session will proceed with enough time allowed to prepare, e.g., typing information on the character generator may require hours, depending upon amount of material to be typed. Not only must the instructor be organized in content presentation, a well defined plan has to be given to the production crew so that they can be organized too. This planning often pays off in a polished presentation with everyone happy. If it does not occur, however, the opposite can result.

Sustaining Students After Class Begins

It is exciting to be a part of a television classroom experience if all goes well as planned. It is possible to project student's pictures from distant reception sites on the TV monitor while they report in or are talking if pictures have been sent prior to air time. Faculty may wish to take roll call of sites to begin to establish a relationship with students and this is especially true if there are many sites .

Sometimes courses are designed that require at least one trip to the studio by students from distant sites for them to make a presentation on camera. When this occurs, peer socialization, contact with faculty, production crew, and program director can take place. This is a gratifying and fun time. This requirement, however, can also require heroic effort. For example, one student left a child with a fever and was driven 90 miles by her husband over icy roads to make her presentation according to schedule. Her husband waited for her in the observation room during class. Despite, all this, at the end of her presentation she spontaneously said to her classmates all over the state "Don't worry! Making a presentation over TV isn't bad at all! Everyone here helps you and you'll do fine!"

Other strategies for socialization include eating out in an agreed upon place after the last class.

In classes when the format is more lecture than interactive debate, it is still possible to personalize instruction to students at distant reception sites. Creative faculty who can be informal might say to a group of students "If I come to your city where could I go to get good seafood?"

Validating Perceptions of the Experience

The same evaluation instrument for student feedback at the Indiana University School of Nursing has been used since the program began in 1985 and is available upon request. The response rate for student questionnaire return (up to summer session one 1988) is 32%. The questionnaire covers student perceived support from faculty, administrators, counselors, reception sites, peers, and employers on a 5 point Likert scale. Open ended comments provide additional data from which family support is inferred. Table 1 shows the results represented in percentages

TABLE 1
STUDENT EVALUATION OF NURSING TELECOURSES

ITEM	% of Agreement	
	Some Extent	Great Extent
Know about program	34	37
Know how to participate	-	56
Library resources adequate	-	54
Textbooks available	-	62
Course Materials	-	80
Counselor accessible	40	31
Registration satisfactory	30	44
Participate in class	-	74
Instructor feedback helpful	-	78
Like more contact with faculty	40	34
Clear TV reception	-	77
Clear Visual aids	35	56
Technical problems hindrance	35	20
Want to registre on own campus	-	63
Prefer course on own campus	-	39
Want more contact with peers	37	39
Supported by peers	-	72
Supported by employer	-	48
Responsible for care of family	12	65
Enjoy TV classes	24	66

There were 165 spontaneous comments and they were categorized as positive, mixed and negative. Sixty eight percent were positive, 20% were mixed, and 12% where negative. Mixed and negative comments requiring corrective action were attended to immediately in the form of oral or written feedback and follow up with appropriate persons. Postive comments were often enthusiastic with appreciation expressed for learning opportunities.

Summary

Teaching by videoteleconferencing requires the necessary equipment and staff to send the signal. It also requires adaptation of the teacher to this mode of teaching and adaptation of students at distant reception sites to this way of learning. A great deal of preparation is required for videoteleconferencing classes before classes begin. Classes go smoothly to the extent that student needs have been anticipated and met. The only unpredicatble elements that are different in videoteleconferencing from the traditional classroom setting are technology failure and/or weather that inhibits the transmission of the signal.

We have found that if students can feel supported in their learning goals they can endure any failure at any step of this process. We have also found that students compare favorably in achievement with students in traditional classroom settings.

Information Networks: New Roles for Libraries in Education

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To say that computer technology is changing the way information and knowledge are transmitted to learners, however they are defined, has become almost a truism. From remote sites people can now ask for and receive information once limited to those within walking distance of a library's card catalog and shelves. Online library databases such as the Online Computer Library Center or OCLC, which contain the holdings of hundreds of libraries of all types, have permitted the development of extensive and responsive interlibrary loan networks.

The next step, direct computer access to individual library holdings and through communications gateways to the larger universe of information, has already begun to revolutionize the way people think about, gain access to, and use information. It is probable that within ten years we all will use library networks to search for books, journal articles, government reports, dissertations, works in progress, reviews, abstracts, research files, directories, and more, from home, dorm, or office computers. We will also order relevant materials, work with information experts on complex problems, and receive citations, texts, and entire documents by computer, telefacsimile, and satellite transmission. The search for knowledge will be done, not with the feet, but with the fingers.

Some people cannot wait for this to happen while others have trouble picturing it, or believe that computers are highly overrated and will pass, or dread the future. Those who believe that computers are only bastard extensions of typewriters or who believe they are a fad fated to fade away are too late. Many of the pieces for a societal paradigm shift are already in place, and we are waiting only for technology to catch up with the imagination and for budgets to catch up with technology. Like the shift from an aural to a visual culture in the fourth century BC or the shift from manuscript to book in the fifteenth century AD, it is impossible while old and new communications technologies coexist to know how the new will ultimately affect society--how it will get under our skin. But even a brief look at how our vocabulary is changing, indicates that it is and will continue to have an impact in both perceptible and imperceptible ways.

Though it is impossible to predict the future, there are some intriguing visions. Apple Computers has a five-minute video called **Knowledge Navigator** which presents an anthropomorphized computer which acts as a private secretary, computer, and data bank for a faculty member all rolled into one. EDUCOM also has a vignette of a faculty member who examines messages, reviews articles, corresponds with graduate students

and colleagues, and prepares visuals for a lecture from his computer.

The visions can be either exciting or chilling, depending from what vantage point one views them. They certainly, however, raise a host of questions for those involved in education, not the least of which are related to the complexity, cost, and ownership of information in a decentralized information society. Another set of important questions revolves around the new skills people will need to find the information they need and how they will get these skills.

We can easily look around us and see how much more information--or knowledge, for those who are on the other side of the semantic issue--there is. Besides books and journals there are films--in 8, super 8, and 16 millimeter varieties--slides, videotapes. audiotapes, microfilms, microfiche, CD-roms, other optical storage disks, and online files--personal, administrative, numeric, textual, commercial, and public. With no reference at all to quality, the quantity of information alone continues to grow exponentially. The answer for libraries and library users no longer lies in ownership of resources, but in access to them. And to make access effective, libraries will have to forge alliances and mounted coordinated efforts on an unprecedented scale.

If we provide access rather than ownership--and libraries will of course continue to purchase traditional forms and formats of information on a large scale into the foreseeable future--we must address the issue of cost. This is not the cost of getting information to someone at a remote location, which is steadily decreasing, but the cost of using the information itself, a problem new to libraries and to Western society in general. We are used to having libraries purchase information in the form of a book, journal, or whatever, once and then make it available in perpetuity at no additional cost to the patron. Commercially owned electronic information, however, is paid for differently. Each discrete use of a piece of information comes with a price tag, usually connect and use charges which can be as high as a dollar a minute. So what amounts to a rental fee is charged over and over again.

The costs can be so great that some or all are currently be passed on to users, raising the spector of a society in which only the wealthy will be able to afford to be information rich. This is a serious concern which touches the central value of an informed citizenry in a democracy--without a gatekeeper, whether in the guise of a librarian or someone else, making a determination of whether any given request for information is serious or frivolous.

The ultimate issues of who owns information and the extent of their responsibilities are central. In the 1980s we have seen an alarming trend toward making public information privately

owned. This has happened most visibly on the federal level. As agency budgets have been reduced, funds available to publish government information have been cut, thus limiting--in some cases drastically--the ability of the public to know of its existence or to obtain a copy. More important in impact, though, has been the policy reflected in the Office of Management and Budget's Circular A-130 which requires "maximum feasible reliance on the private sector for dissemination of [government information] products or services." There is reported pressure by segments of private industry to block GPO steps to enter into electronic publishing activities.

What about all that other information out there, a lot of it scholarly in nature, and held in the mainframes of such private companies as BRS and DIALOG? Libraries have learned to provide expert searches of them for patrons but are also experimenting with such user-controlled subsets as are increasingly available in CD-rom. More and more research libraries, however, are coming to believe that CD-rom is just a phase, and that the future will involve mounting whole, frequently used database subsets by subscription into campus online information networks which will allow unlimited uses by patrons on campus and off.

Another issue involves new skills which we will all need to tame this brave new information world. What are they? Where will people get them? One thing we can see is that the computer sophistication of incoming students is growing by leaps and bounds. We are getting students who are not technophobic, who will gravitate to computer terminals instead of the card catalog by choice, and who learn online strategies quickly. We are even beginning to see students who are impatient that the system cannot yet do everything they want it to do. Whatever is happening in the grade schools and high schools seems to be appropriate for the moment. But schools themselves have uneven access to computer resources for teaching students, and we suspect that there is yet no set curriculum nationally for teaching computer literacy--something akin to learning the names of state capitals in fifth grade and reading Julius Caesar as a sophomore in high school.

What does this all have to do with teaching at a distance? Two librarians at Central Connecticut State University, Marie Kascus and William Aguilar, have offered some sobering thoughts ("Providing Library Support to Off-Campus Programs," **College and Research Libraries**, January 1988). They note forecasts indicating that by the year 2,000 the student population in institutions of higher education will experience an 18 percent decrease in full-time enrollment and an eight-percent increase in part-time enrollment. In addition, competition from other education or training providers will increase. Off-campus programs, they predict, will be viewed as a means of stabilizing or increasing college and university enrollment.

The two cite accreditation standards of the New England Association of Schools and Colleges, the North Central Association, the Northwest Association, the Southern Association, the Western Association, and the Middle States Association, which all include provisions calling for adequacy of library and learning resources and emphasizing the importance of access at times convenient for off-campus students. And in states such as Connecticut, for example, regulations assume that off-campus programs will provide core collections, reserve reading collections, professional library staff, supplementary materials, adequate funds, and access to adequate facilities.

When viewed apart from the whole, this is a tall order and an expensive one for libraries. The proliferation of communications technologies, however, can be seen as a boon when taken in this context rather than a burden. Information can be provided over phone lines or through fiber optics from a centralized source to any remote location suitably equipped. Information can be sent through the mail, transmitted through audio or video frequencies, or delivered the old-fashioned way through personal contact. Users can interact with experts by letter, by phone, or by electronic mail. There is the potential for the world of knowledge to open wide rather than to constrict.

In the meantime there is a lot of work to do:

* Each database which becomes publicly available has its own search strategies and sign on and off protocols. These have to become simplified and standardized for people to gain the control over electronic information that they have been schooled to have over printed information.

* Instead of learning the card catalog and getting an instinctive feel for Dewey decimal or Library of Congress classifications, students from an early age will need a sense of Boolean logic and set theory.

* As citizens we have to ensure that, unlike the fifteenth century when government and the Church tried to withhold information from the public because the new technology of printing made it potentially more accessible, government encourages sufficient levels of information sharing to maintain and to foster an informed citizenry.

* As educators we have to increase instead of decrease our demands on technology until it meet our needs, rather trying to adapt ourselves to whatever the marketplace would like to sell us. We have to make our information technology transparent; right now it is all too visible and cumbersome.

* Libraries have to work together in forging new alliances both with each other and with the teaching academy and also in making old alliances work in new ways. All this without making

society resemble the ludicrous pipe network in the movie **Brazil**.

* And finally, librarians themselves have to become comfortable with a leadership role in education. The traditional background role has become outdated. Research library staffs are today complex mixes of expertise in technology, subject areas, and service. They have something to offer in the general educational debate, and it is time to jump in. This will be especially true if demographic predictions are correct, and education begins to focus more and more on the individual learner, whom librarians see and deal with on a daily basis, whether in person or at a distance.

The alternative side to the automation vision is rather bleak--a society in which the wealthy and powerful control those for whom information is either forbidden or out of financial reach. Somehow I can't believe we will let this happen. While we may not embrace technology in quite the way Katherine Hepburn and Spencer Tracy do in **Desk Set** as the third and equal partner in a menage a trois, we can learn to use it and to stretch it to realize new goals. To paraphrase Theodore Roethke, I am confident we will all "learn by going where we have to go."

America's Rural Colleges and Distance Education: The Electronic Classroom in the Information Age

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The purpose of this paper is to describe a Model Information Classroom (MIC) project at Chadron State College and, given digital information transmission, what we envision for American education.

Games and puzzle software and the ubiquitous hodgepodge of wires and gadgets is the initial glimpse of a paradigmatic change. We are witnessing an educational shift away from computer laboratories and toward information-enhanced, electronic instructional delivery.

Expanding digital information transmission is a reality which will greatly affect life in American classrooms. In Mindstorms, Seymour Papert (1980) wrote:

> I see the classroom as an artificial and inefficient learning environment . . . I believe that the computer presence will enable us to so modify the learning environment outside the classrooms that much if not all the knowledge schools presently try to teach with much pain and expense . . . will be learned . . . painlessly, successfully, and without organized instruction. This obviously implies that schools as we know them today will have no place in the future. (pp. 8-9)

Inexpensive and effective hardware and software will permit all schools--large and small, rich and poor, urban and rural--to utilize the world's growing resources of digitized text, graphics, visuals, and sound. Teachers will enhance their instructional productivity, and, ultimately, their educational effectiveness. Experience, unfortunately, does not always verify dreams.

We have learned that educational projects, even high tech ones, depend on much more than finding the funds, ordering the gadgets, and plugging them in. Experience indicates that instructional change is more of a human problem than it is a technological or even an educational one.

This paper will address three specific components of our MIC planning experience: (1) technical design and project philosophy; (2) institutionalization; and (3) educational evaluation.

Model Information Classroom: Philosophy and Design

Our image of an electronic and resource-enriched model information classroom (MIC) has been brewing for nearly three years at Chadron State College. In the fall of 1986, our College President appointed an interdisciplinary task force to plot our institution's future in educational technology.

Chadron State educationally serves a vast but sparsely populated northwest corner of Nebraska. Routinely putting college instructors into cars destined on wintry evenings for faraway class sites is dangerous and expensive. Therefore, the College has experimented with different curriculum packaging and delivery systems; we had already enjoyed moderate successes with videotape instruction, teleconferencing, and even slow scan television. Emerging educational technology, some reasoned, would offer better opportunities.

By late 1986, the Presidential task force composed a working paper which outlined, in part, Chadron State's technological future in classroom delivery and instruction. This document was shared on campus and throughout the state with government officials, educators, and private telecommunication corporations.

In short, this working paper called for the construction of a Model Information Classroom (MIC) which would assemble an array of applied instructional technologies on campus. Shortly thereafter, Drs. Roweton and Wess received Title III federal funding for the construction of a MIC prototype.

By the fall of 1987, Chadron State's original plans for a single MIC facility on campus were tremendously modified. By then, of course, we were discussing our MIC pilot and its statewide implications with various educators, state officials, and telecommunication corporations. One expanded model linked Chadron State, Peru State,, and twenty (20) public school sites.

Our planning evolved, and many were intrigued with the details. All this culminated in a meeting called by Nebraska's Commissioner of Education, Dr. Joe Lutjeharms, on January 6, 1988.

On this very cold January afternoon, the State Department of Education urged Chadron State and Peru State to continue their proposed pilot planning. Also as a result, an Operations Committee and an Oversight Committee were formed to manage pilot project activities. Funding efforts and further system refinement followed, and our campus MIC project was suddenly one component of a statewide pilot, "Nebraska in the Age of Information."

The statewide system is a hardware/software configuration consisting of an Instructional Production Center (IPC) and Model Information Classroom (MIC) located at Chadron State and Peru State.

Each MIC consists of fifteen (15) fully-equipped student work stations and one teacher station. Furthermore, all MICs will be networked. Each college MIC/IPC will be electronically linked to ten (10) remote sites located in ten (10) area public schools. All system participants will have access to a common electronic resource library.

The system will feature seven characteristics. One, we will enjoy cost-effective access to local and international databases. Two, we will have the capacity to change print, voice, graphics, and pictures (still or motion) into digital format and back again. Three, we will be able to visually project our instructional products onto large monitors at both Colleges and

at each remote site. Four, we will freely integrate voice, sound, graphics, and pictures. Five, we will store our curricular sequences for reviewing and editing. Six, the system will be user-friendly. Seven, Chadron and Peru will co-sponsor information product development and delivery services.

Educationally, we will emphasize intra-collegiate projects (e.g., distant education to remote sites; information enrichment of existing courses), teacher-initiated and collaborative school projects, and inter-collegiate projects (e.g., shared library resources; curriculum projects).

Our MIC/IPCs will enhance instruction. More of our graduates and Nebraska's workforce will be computer and information literate and, therefore, they will be more valuable human resources for Nebraska's economic development.

Institutionalization

In 1911, Charles Kettering and a group of young technicians met in the evenings after work and on weekends in a garage behind Ed Deed's home in Dayton, Ohio. They were developing the auto self-starter for Cadillac.

> Speed was crucial. Many inventive competitors were already in the field. Besides, Leland needed Kettering's system in time for his 1912 models. One of the crew recalled, "We didn't know about 5 pm. All we knew was light and dark." They just met the deadline, the last few days working around the clock. (Bernstein, 1988, p. 130)

Given no bureaucratic support but much personal enthusiasm, the "barn gang" overcame time and technology.

Is America's era of table-top physics and baling-wire inventions dim history for the 1980's? I am not sure, but I am confident that today's inventiveness is slowed by layers of bureaucratic institutionalization.

Innovative planning speeded along when the MIC project involved only several of us charting Chadron State technological horizons. The spirit of the project's early days were akin to Kettering's " 'intelligent ignorance,' a kind of well-informed curiosity coupled with the persistent willingness to try" (Bernstein, 1988, p. 125). But, soon, many others were implicated. The potential involvement of several dozen school districts stimulated the attention of Nebraska's Department of Education and other state agencies. As our planning focused, technical modifications were required, and AT & T, our primary technical partner, was more explicit about the statewide system's potential and limitations. Potential financial contributors had their own ideas about, for example, where school sites should be located. They were many more of us dealing cards at the same table, but all of us were not using the same rules. Inter-agency communication was atrocious.

In just six months, our project was grandiosely institutionalized, and our efforts to "coordinate" slowed planning to an agonizing halt. The original project's "barn

gang" changed their working attire to three-piece, blue-stripped grays, and our marching tempo stalled.

Educational Evaluation

Although all seemed vitally committed to valid project assessment, designing effective evaluations of computer-assisted instruction (CAI) remains a perennially pesky problem for educators, researchers, and technicians (Becker, 1987; Bozman & House, 1988; Kulik, Bangert, & Williams, 1983). Many studies are methodologically entangled, and CAI is besieged by marketing "hype." In short, performance data confirming CAI's efficacy is scanty (Becker, 1987). And, at this point, it is impossible to know whether the glitch lies in data misinterpretations, in inappropriate designs, or in ineffective hardware/software.

Schools who have purchased expensive instructional technology and corporations who sell it want the applications to look effective. Undoubtedly, all this effects evaluation.

Evolving applications.--The first generation CAI consisted of stand-alone personal computers (PCs). Students worked alone on commercially or locally packaged curricula and learning games. Much of this was drill and practice, and proponents felt that CAI would relieve the burdens of routine teaching.

The second generation CAI emerged as systems in the 1980's. For just a few schools, the student PCs are networked, and students learn to access informational databases. Consequently, states, most notably California and Minnesota (Patterson, 1987), expect CAI to graduate from drill-and-practice to higher order thinking skills. As applications become more sophisticated, evaluation problems mount.

Second-generation applications are ushering forth third-generation educational applications. Instructional focus is shifting decidedly toward the teacher as instructional designer and producer. As in the MIC project, teachers will digitize and then integrate visual, textual, sound, and data into carefully and comprehensively orchestrated instructional displays. In short, our teachers will have far greater command of instructional information and production, and they will be expected to employ it productively.

Our concern about project evaluation is the same one pestering American education: "What would be fair measures of the effectiveness of our educational programs?" (Baker, 1988, p. 10).

Baker (1988, p. 11) does offer, fortunately, seven useful parameters for sound educational evaluation: (1) use multiple measures of a single phenomena; (2) employ multiple testing formats; (3) provide adequate time for "serious" cognitive activity; (4) measure both content and process; (5) design tests so as to guide instructional planning; (6) yield test results that are understandable to teachers; and (7) make summary reports fair to students, teachers, and schools.

However, it is one uncertain leap from a small set of guiding principles to a plethora of dependent variables. Some evaluation data will be reviewed.

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MEETING THE NEEDS OF RURAL LEARNERS USING AUTIO TELECONFERENCING AND COMPUTER GRAPHIC TECHNOLOGY

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MEETING THE NEEDS OF RURAL LEARNERS USING AUDIO TELECONFERENCING AND COMPUTER GRAPHIC TECHNOLOGY

Delivery of educational services to adults in rural areas has always been a difficult issue. The fundamental problems of meeting minimum class sizes, locating qualified instructors, achieving quality and excellence standards and maintaining the transferability of academic and vocational coursework to other institutions continues to plague rural education.

Satellite, microwave and cable television are all technologies that can provide answers to some rural delivery questions. However because of low student volume, costs of hardware and installation, these often end up being very expensive solutions with marginal justification. Major expenditures for extended programming are difficult to come by for many community colleges because of the priority (or lack of priority) that is given to off campus endeavers. With funding limitations that have occurred in most states during recent years, capital and development resources have been in short supply and generally have ended up in allocations for campus based programs.

These limitations haven't changed the facts though; the need for delivery into rural areas still is a pressing issue. So the question has become "Is there a way to deliver campus based programs into isolated rural areas while at the same time maintaining cost effectiveness and quality?"

An exciting answer to this question is being explored at a satellite campus of Community Colleges of Spokane, located in rural northeast Washington State. Community Colleges of Spokane (CCS) is one of the largest (geographically) districts in the United States. Its boundaries encompass six counties, covering over 12,000 square miles of relatively sparsely populated land. The southern three counties are primarily wheat land, with the northern three counties being quite mountainous with farming and timber based economies.

Spokane, with a population of 187,000 serves as a geographic hub of this area. The surrounding counties add another 90,000 who need educational services. CCS evolved

and now includes two campuses, Spokane Community College, with primarily industrial/trade/vocational programs, and Spokane Falls Community College, with primarily liberal arts and vocational programs. The CCS Institute for Extended Learning was created to serve the areas outside of metropolitan Spokane. Satellite campuses, one at Fairchild Air Force Base on the west edge of Spokane and one centrally located in the middle of the three northern counties at Colville Washington, provide the backbone of the delivery of coursework in the outlying areas.

The community college campus in Colville serves almost 8,000 square miles of mountainous, isolated terrain. During the sometimes severe winter months access with the outside world is often limited due to snow and narrow icy roads. In order to meet the needs of people in the rugged areas surrounding Colville, the center began experimenting with teleconferencing in the spring of 1984. On the other side of Sherman Pass, the highest mountain pass in Washington state, lies the little gold mining town of Republic. This classic little community reminiscent of mining towns of past generations is located 55 miles from Colville and over 120 miles from Spokane. A Colville phone line extending to a classroom in a rented store front in Republic provides the necessary teleconference linkage. Using AT&T Quorum tele- conference equipment, lecture oriented classes that are offered at the Colville Center can now be offered over the telephone lines to students in Republic. Students are enrolled as adjunct students to the Colville classes. Because it is a two-way interactive system, students in Republic have the ability to have dialog with students and the instructor who are in the Colville classroom. In the event that a qualified instructor is located in Republic, classes could just as easily be initiated there and extended the opposite way to Colville.

With the help of grants from local business and industry, the Colville Center is expanding this teleconference delivery model to include additional locations. Already in the 1986-87 school year the program has been extended to Inchelium, located on the Colville Indian Reservation.

Rumors about the success of the concept have circulated excitedly on the area "grapevine". Already other small communities such as Chewelah, Ione, and Newport have made inquiries as to when the service can be offered in their communities.

In addition, grants have provided the opportunity to enhance the audio system with Optel Telewriter III, a hardware/software package which provides interactive computer graphic capability that can be used simultaneously with audio. This capability gives the instructor the ability to have an electronic blackboard and image transmission. Handwritten comments can be made using an electronic tablet, and an electronic pointer can be used to refer to items on the screen; the instructor can also use the computer keyboard to make typewritten comments. In addition, because of the systems digitized image capture capability, instructors can make graphics or capture pictures, charts, etc. from reference materials and transmit this information to their classes. Students in the remote locations have the same hardware, and an electronic bridge allows all locations to interact with each other. To facilitate the exchange of written or printed materials each location is served with daily UPS delivery service.

Initially administrators and instructors were concerned over whether students in the remote locations would be handicapped because of their inability to see the instructor. Over several terms quite the opposite was found to be true. Much to the surprise of instructors, students in the rural locations consistently earned higher grades than those who are in the classroom with the instructor. How could this be? Tests are proctored by a college facilitator in each remote location. No special considerations are given to the remote students. At first, it was puzzling, but after months of study on this issue, instructors are now in agreement that the rural students develop superior listening, out-lining, and study skills, and have a higher level of desire to succeed because of their limited access to educational services.

While the concept of the electronic classroom has been around a while, this system is unique in that it uses a single voice grade dial-up phone line for simultaneous audio and data transmission, keeping line costs to a minimum.

Classes in Psychology, Humanities, Business Management, Early Childhood Development, American History, Literature, Politics, English, Personnel Administration, Geography, Introduction to Business, Accounting, Business Law, Business Correspondence, Ethics, Logic, Speech, Money Management, and Home Schooling have all successfully been offered over the audio conference network. Additional grants from the State Board for Community Colleges and from

the Perkins Act are providing funds for curriculum development for new classes and curriculum enhancement for existing classes. Other grants have provided for the development of teacher training materials and a video tape presentation of the teleconference system and program.

The system is in operation from 8 in the morning until 10 at night. with very few unused hours. This keeps the cost per hour very low. Non-credit community service classes are also offered using the network. All of these factors blend together to provide a low cost, powerful communication system that gives considerable flexibility and capability for meeting rural needs. Using this system, students in the rural areas can be enrolled in existing classes at the Colville Center, thus doing away with the problem of low enrollments in the rural areas. Existing highly skilled instructors are in effect taken to the isolated areas over the phone lines, providing high quality instruction in areas where finding qualified instructors is generally a problem. Using this system students in isolated areas can have access to many of the same services that a student going to school on campus would have. For example, veterans and financial aid advising can be provided over the teleconference line. Students can participate in student government on the network, and requests for library services can be channeled over the phone system. Another positive side benefit is that students in classes using this technology have a built in opportunity to become computer literate in a natural environment. The system provides continuing reinforcement through the day to day practical application of the skills that are used in each classroom session.

The Colville Center's teleconference system is an exciting project which effectively demonstrates through the blending of resources, technology and expertise, how communities, business and industry, government, and community colleges can work together to achieve delivery of educational services to a special population. Whether rural students participate in a class for their own self improvement or in preparation for further schooling, the teleconference system meets their needs for both quality education and interaction with fellow students and instructors. The system also demonstrates that there is a cost effective way to deliver campus based programs into isolated rual areas.

Information and consulting services on this concept are available through Herb Munro, Director of Extended Programs North, Community Colleges of Spokane, Colville Center, 165 E. Hawthorne, Colville, Washington 99114. Phone 509-684-3138.

DISTANCE EDUCATION IN ACTION:
THE WISCONSIN RURAL READING IMPROVEMENT PROJECT

Summary of paper read at the 4th Annual Conference on Teaching At A Distance
Madison, WI. August 3rd, 1988

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BACKGROUND--The overall goal the Wisconsin Rural Reading Improvement Project is to demonstrate a research-based telecommunications model of professional development and school improvement that rural school districts can use when redesigning K-12 curriculum. The project has three strands: technology, staff development and reading curriculum change, all of which are interpreted in the context of small, rural school districts.

The project is funded for both years (1987-1989), through the North Central Regional Education Laboratory (NCREL), which receives its funding through the U.S. Department of Education's Office of Educational Research and Improvement. The objective of NCREL is to learn as much as possible about school improvement in reading; and to share this information with the six other states in the NCREL region (Minnesota, Iowa, Indiana, Ohio, Michigan, and Illinois) and other regions.

Cooperating in the Wisconsin project are 18 districts with K-12 enrollment of 900 students or less. The participating districts are:

> Abbotsford, Alma Center, Athens, Blair, Bruce, Cornell, Edgar, Eleva-Strum, Fall Creek, Granton, Greenwood, Independence, Holcombe, Melrose-Mindoro, New Auburn, Spencer, Stratford, and Weyerhauser.

The project is co-directed by staff from the Wisconsin Public Radio and Television Networks and the Wisconsin Department of Public Instruction. External evaluation of the project is being conducted through the Center for Educational Evaluation and Policy Research in the University of Northern Illinois' College of Education. In the first year, they conducted two formal external evaluation studies: a pre and post survey of project participants and comparison group teachers, and case studies at five of the districts. The evaluators attended and observed at project meetings, worked with the project staff to build a file of project documents, and provided formative feedback or exchange of information to the project staff. Internal evaluation and formative feedback to the evaluators is provided by the co-director from Wisconsin Public Radio and Television Networks. During the first year, some changes were made based on formative feedback. Planning for the second year particularly used the first year evaluation findings.

TECHNOLOGY PERSPECTIVE--Across America today, telecommunications technologies, are used by small, rural school districts primarily for two purposes: courses for students and teleconferences, which are short courses for administrators, teachers, maintenance staff, school board members and other involved in the district's educational programs. Secondarily, telecommunications technologies are used to provide for students and staff members, unique opportunities to communicate and network with their counterparts or experts, in distant places; and to provide inservice and graduate credit courses for teachers.

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A third and yet to be demonstrated use of telecommunications technologies is for longitudinal and mediated staff development projects in which the goal is radical curriculum change, that is, substantial and basic shifts in the the overall curriculum or in a particular content area. The Wisconsin project was funded in part because it proposed to use technologies in this third manner. The two Wisconsin agencies had cooperated in earlier projects for changing the K-12 reading curriculum via the use telecommunications technologies in the more traditional "course" and "interactive, short-term teleconference" manners. Summative evaluation research conducted by Wisconsin Public Television Network showed that these approaches were not having the expected curriculum and instruction benefits, particularly in small, rural school districts (Wilsman, 1986, 1987 & 1988).

STAFF DEVELOPMENT AND READING PERSPECTIVES--Early writings by McLaughlin (1977 & 1980) have documented the ineffectiveness of present staff development programming for bringing about K-12 curriculum changes that are substantial and lasting in nature. Building on these findings in the area of the reading curriculum was a four-year staff development study by Ogle (1986), which was conducted in one medium size, rural district. Ogle's research findings suggest some of the staff development opportunities that were best in producing radical changes in the K-12 reading curriculum, such as staff development opportunities for principals in which they learn about the new definition of reading as thinking, begin to model in classrooms the new reading behaviors, and plan with teachers for gradual introduction of new reading instruction procedures. These principal staff development activities include the more formal kinds of meetings as well as guided classroom observation.

While not all areas of the curriculum may be in need of radical change, there exists in the language arts and reading curriculum, well documented theory and research that reconceptualizes not only the over-all, long-term curriculum aims, but also the content and instructional strategies. Here the reconceptualization is of reading, writing, listening and speaking as interactive and interrelated processes. Also involved is the reconceptualization of the teaching of reading as thinking; teaching reading in the content areas; integrating reading, writing, thinking throughout the phases of learning; and strategic reading and strategic teaching. These concepts require teachers and principals to reconceptualize their understandings of reading, the role of the student, the nature of curriculum and instruction, and the role of the teacher, that is, they require teachers and principals to alter dramatically and radically, their knowledge, attitudes and behaviors. Over a decade ago the case studies of curriculum change in Great Britain and the United States, edited by Reid and Walker (1975) documented the complexity of problems related to changes that require extensive reconceptualizations by principals and teachers.

The Wisconsin project uses an approach to staff development that is grounded in the assumption that change in school reading programs proceeds via extensive reconceptualization on the part of administrators and teachers. This assumption is supported by principles of conceptual learning as well as principles of self-directed conceptual change. Such principles are explained for example, in the earlier writings of David Hunt in Conceptual Systems Change Theory and its application to education (See for example, Hunt and Sullivan, 1973) and the more recent writings of Robert Stake on naturalistic or evolutionary models of staff development (Wideen and Andrews, 1987). Hunt's work provides a description of how reconceptualization proceeds or fails to happen. Stake's piece describes the nature of staff development programming that embodies the view that change is self-directed. Stake compares programming for naturalistic change to the replacement or creationists view of staff development in which the belief is held that change can be created and does not require integration with existing structures, views, and concepts.

TELECOMMUNICATIONS TECHNOLOGIES--Five telecommunications technologies are being used in the project: broadcast public television (in Wisconsin their is a state public television and radio network), narrowcast FM public radio (called SCA instructional radio, a service of Wisconsin Public Broadcasting Network), narrowcast television(called ITFS and also a Network service), telephone conferencing (called WisLINE, a service of the University of Wisconsin Extension, Instructional Telecommunications Systems), and electronic mail and forums (called LEARNING LINK, another service of Wisconsin Public Broadcasting). Each district provides a color television and VHS recorder which are used to tape and playback at a later time the television programming. A special receiver was provided to each district for reception of the SCA radio programming. Some districts paid to install FM radio antenna; and some districts needed to relocate their tape recorder with a proper audio-in jack. Five districts within the 25 mile required range of the Wausau public television transmission tower that is used to distribute the ITFS programming, were provided with a microwave antenna and connecting cable. Each district received one set of telephone conferencing equipment which provided them with three speakers and a portable carrying case. Each district also received a computer modem and electronic mail software. The districts installed the phone lines for operating the telephone conferencing and electronic mail equipment.

PROGRAMMING--These technologies are not used solely in the traditional manner, which is primarily to deliver information or new instructional resources. Because of the project's concern for self-directed conceptual change, that is, use of the naturalistic model of staff development, existing programming is "repurposed" or used in another manner. This new focus is on the details of the daily practice of participants. For example, broadcast television is used to deliver two video series produced and evaluated by the Network:

> "Teaching Reading Comprehension" fourteen, thrity-minute vidoe programs for in-service education. Each reading specialist and target teacher received a copy of the 80-page viewer's guide that accompanies this series.
>
> "Storylords" twelve, fifteen-minute video programs for second through fourth graders. Again each teacher recieved a copy of the 65 page teachers guide.

Via other technologies, like SCA radio programming and WisLINE telephone conference call, the project staff helps participants to use this programming to reflect on their own daily practices in the classroom. Participants are encouraged to first view themselves a learners who primarily are concerned with monitoring their own view or definition of reading as reflected in the details of their daily practice in the classroom or outside of it, as when they themselves are reading professional pieces. Participants are discouraged from immediately seeking to implement or create new, innovative programs or implement innovative practices. This is done so that participants have an understanding of the rationale underlying the programs, in "Storylords," for example, before using the programs with students in the classroom.

Programming also is designed for the purpose of helping participants come to share a common language for describing, analyzing and reflection on daily practice. Coming to share this common language involves the building of a common culture, which according to Stake's piece cited earlier, takes place via the examination of formal theory, codified data, direct experience and vicarious experience. Telephone conferencing and electronic mail are used to promote this development of shared language, and to present direct experiences. The ITFS and public broadcast programming are used to present case studies which can be considered vicarious experiences.

DISTRICT PARTICIPATION--Each participating school district has assembled a district leadership team composed of an elementary school principal, library-media specialist and reading specialist. Because we are working in small, rural districts these team members frequently have another position.

For example, three principals are also the district's reading specialist and three are district administrators. Most reading specialists are classroom teachers or Chapter 1 teachers. Some library media specialists are teachers--we have a German teacher and a fourth-grade teacher.

During both years of the project $1,600 is allocated to each participating school district to provide for staff release time for these team members, particularly the reading specialists to learn the new view of reading and reflect on their own view as it is embedded in their daily practice.

All leadership team members are expected to learn and model reading as thinking and the new reading instruction which follows from this view of reading. In addition, each leadership team member has other roles and responsibilities. For example, besides serving as the district project coordinator, the elemtary principal is expected to use the new view of reading as thinking when planning with teachers and when observing and evaluating in their classrooms.

Each team has assembled a first group of elementary school teachers who are called target teachers. They also are expected to participate in some of the distance education activities and to learn about reading as thinking and new reading instruction. The other elementary school teachers in the district were to gain some awareness-level familiarity with this new view of reading and reading instruction by observing in the classroom of target teachers or particiapting in a less extensive program of professional development activities. Districts were encouraged to select only two to four target teachers in the first year. These teachers would provide opportunities for the leadership team members to have direct experiences needed to build a new common language and to reflect on daily practices.

FIRST YEAR LESSONS LEARNED--Many lessons were learned in the first year related to the acquisition, installation and debugging technologies; the fanaticism of some persons with technologies; and the difficulties experienced by participants who are not comfortable with using telecommunications technologies, nor familiar with reflecting closely on daily practice and sharing new language and their direct experiences, in a learning mode, with others. Most participants came to the project expecting the project staff and consultants (experts) to deliver the answers in clear, simple packages; expecting changes to come quickly--in one year and then move onto another area of the curriculum.

The external evaluation findings show that by the end of the first year, some reading specialsts, and target teachers were coming to understand that a definition of reading is reflected in one's daily practices; and that the new definition of reading entails a good deal of reconceptualization on their part. They were beginning to see themselves first a learners, a new role for many. The case studies, survey responses, and project staff observations document changes in the way some project teachers and reading specialists teach reading. These changes were accompanied by use of new language to talk about reading as thinking and new views of reading as a thinking process. There was evidence that in most sites, this new language, view of reading, and classroom practice, came to teachers from the distance learning programming supported by colleagial interaction. Teachers and reading specialists generally believe that students, particularly the less able ones, benefit from this new approach to reading as thinking.

All project participants are looking forward to a second year and are developing some insight into the longitudinal nature of changing the reading program. Two aspects of the project that will receive more attention in the second year are (l) clarifying and developing the roles and responsibilities of the three members of the district leadership team and (2) helping all participants learn more about distance learning and new ways of

distance learning programming and equipment. The internal evaluation in the second year will focus on the extent to which the programming embodies the principles of self-directed conceptual change or naturalistic views of staff development. The external evaluation will expand to include student testing. The other first year external and internal evaluation procedures will continue in the second year.

EDUCATIONAL IMPORTANCE--The rural education community seems determined to use of telecommunications technology to benefit schools. Least explored has been its use for longitudinal and naturalistic staff development and K-12 curriculum redesign. The present project should make the rural education community aware of new and future uses of telecommunications technology; and its potential cost effectiveness for these normally expensive undertakings. The present project has implications for the criteria that could be used to examine the programming delivered to students as well as teachers. That is, there are instructional design issues to attend to when discussing programming, not merely curriculum enhancement issues.

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PRESENTATION TITLE:

Using Two-Way Television in Elementary and Secondary Schools

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Abstract

This presentation will describe the ways in which the University of Lowell Instructional Network uses cable and microwave technology to expand learning opportunities for elementary and secondary schools. Initial programs identified instructional strategies appropriate for teaching via two-way television and resulted in the application of distance learning technology to involve students of all grade levels and of diverse needs. Research then turned toward the application of two-way television to provide elementary and secondary teachers access to the varied resources of the University of Lowell, spawning the Science Teachers Accessing Resources (STAR) and a career awareness program for high school students.

INTRODUCTION

The University of Lowell Instructional Network is using cable and micro-wave technology to assist local school districts meet the education needs of their students. Declining enrollment, scarce resources, and teacher shortages in critical subject domains prompted superintendents of schools to explore telecommunications technology as an economically feasible and educationally sound solution to the current crisis. At the center of the network is the university surrounded by a cluster of schools: 3 comprehensive high schools, a vocational school, and 7 elementary schools.

Instructional design of Network programs questions the exclusive use of traditional classroom models with two-way television applications and encourages schools to explore the creative potential of the medium to meet the educational challenges of the 21st century. The model system at the University of Lowell shows the effectiveness of two-way television with a wide range of students and for a variety of educational opportunities.

The focus of this presentation is to describe:

teaching strategies used with the Instructional Network

teacher inservice programs for the Instructional Network

STAR, a series of science experiments conducted at the University and transmitted to elementary and secondary schools via two-way television

School/College/Business partnerships resulting in two-way television classes in career awareness originating at local businesses and transmitted to vocational school classrooms.

INSTRUCTIONAL STRATEGIES FOR TWO-WAY TELEVISION

Selection of instructional strategeies appropriate for two-way television is guided by the belief that any technology should be used as a tool to enhance instruction and not an end unto itself. The little that has been written about the use of two-way television attests that lessons using this form of two-way telecommunications are generally conducted in a lecture format. It is apparent then, that there is a need to expand the research base of teaching via two-way television to ascertain its potential

use with a variety of students and subjects. Strategies that will be discussed include:

demonstration
activity-based instruction
team teaching
discussion
lecture

Instructional Network classrooms provide for total teacher control of the transmissions: no technician is necessary. Equipped with three fixed cameras, microphones, and monitors, teachers operate a special effects generator to choose the camera image to be transmitted to the remote location. Students in both locations are able to see and hear the class at the other location.

STAFF DEVELOPMENT

Staff development programs include the study of instructional strategies to determine modification required by or enhancement resulting from the medium. It is our firm belief that the goals of the lessons transmitted via interactive television should not be constrained by the equipment, yet the capabilities of the latter must be considered in the lesson design. We hoped to show that two-way television does not limit the repertoire of strategies available to teachers, but rather provides new possibilities for those who wish to enrich their teaching.

An important component of the Instructional Network inservice program provides prospective two-way television teachers hands-on practice with classroom/studio equipment. It has been our experience that teachers adapt readily to the use of the special effects generator and become comfortable with this new teaching environment after a few times on the Network.

Teachers also have an opportunity to enroll in graduate courses and workshops offered through the College of Education and transmitted via the Network to schools: teachers avoid the time waste and hassle of travel to the University.

INSTRUCTIONAL NETWORK PROGRAMS

STAR is the collaborative planning of science experiments and demonstrations by University and school faculties. Classroom teachers identify areas of their curriculum that could be enhanced through access to the faculty and facilities of the College of Pure and Applied Science at the University and meet with the appropriate person to design experiments and pre-lab sessions. Experiments are designed to ensure maximum student

participation. In most cases, Univeristy faculty have conducted the pre-lab sessions in the schools to assist students and teachers prepare the sample for use during the actual experiment. The following day, the experiment is conducted at the University and transmitted to the school via the two-way television network. Students are able to ask and answer questions during the transmission and receive graphs and/or charts generated during the experiment through use of a facsimile machine.

Vocational high schools have access to community resources through a unique career awareness program that provides students an opportunity to explore the world of work. Businesses within close proximity of subscriber cable lines are temporarily wired for two-way television broadcasts allowing students a first hand view of real business environments and an opportunity to speak directly with people working in the field through the two-way television medium.

The KEY Program:
A University/School Partnership

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Dr. Per Omland, Superintendent, Perry Central School District.
Linda Sundlof, Coordinator of Distance Learning Programs, Livingston-Steuben-Wyoming BOCES.

Introduction

The KEY Program is a cooperative effort of the Rochester Institute of Technology and the Livingston-Steuben-Wyoming BOCES. Its primary mission is to offer enhanced opportunities to the high school students in this area. Beginning in January, 1988 courses were offered at three sites: Letchworth, Perry, and Warsaw Junior-Senior High Schools.

Since the 1982-1983 school year, the three school districts have been working together with the Livingston-Steuben-Wyoming BOCES district to expand course offerings to their high school seniors. Because they had allowed students in grade 8 to take courses at the grade 9 level several years earlier, they were faced with a need to provide fifth year coursework.

In addition, guidance surveys of graduating students indicated a need for advanced courses to allow college-bound students the same advantages available to students in larger school districts. Faced with small numbers of students (4 to 10 pupils per class), distances which prohibited transporting students, and the new requirements of the Regents Action Plan, the schools have turned to distance delivery techniques to expand their offerings.

L.S.W. BOCES

The function of a BOCES (Board of Cooperative Educational Services) is to provide services and programs for its component school districts which the districts could not operate individually. Budget, personnel or facilities needs for some programs are so large that they are best done on a regional basis, with a number of school districts sharing the cost. If two or more school districts within a BOCES catchment area request an educational or inservice program, and it meets the requirements set forth by BOCES of the New York State Education Department, it can become a "BOCES program." BOCES in New York State provide a wide range of services to their component districts, including education of special populations (e.g. developmentally disabled, occupational programs), curriculum and staff development, and instructional resources such as computer support and repair, and film/video libraries.

The provision/coordination of distance learning programs is a natural BOCES service. For the KEY Program, the L.S.W. BOCES has worked with the schools to assess their needs and, working closely with the classroom teachers, students and RIT faculty, assure that their program needs are being met.

Service to the "special population" of college-bound students could be very expensive to the individual school district. Small enrollment and specialized-subject classes can be costly for small, rural schools to support without sharing resources. BOCES aids this by coordinating

schedules and delivery systems among the participating schools. The BOCES initiates orders for equipment and materials, and uses its videotape duplication facilities to create copies of instructional tapes for each school. BOCES personnel also act as a resource for the operation of computers and other equipment used in the instructional program. Finally, as mandated by the state, the BOCES conducts periodic review of the program, and initiates and coordinates changes, as necessary, which can improve the program.

RIT

RIT has a long tradition of responsiveness and service to the educational needs of its region. For the past several years, RIT has offered courses to students where they live and work using a variety of electronic delivery techniques. Begun in 1980 with 56 students in two courses delivered via cable television, RIT's distance learning effort has grown to involve hundreds of students in a large number of credit courses. Delivery techniques now include cable and broadcast television, videotapes (in 4 learning centers and at home), audio-conferencing, audiotapes, videoconferencing, remote access to the library catalog, and computer conferencing and electronic mail.

RIT has been interested in increasing its involvement with area secondary schools. The university's capability, experience and commitment to delivering high-quality credit courses at a distance, places it in a position to meet the needs of the L.S.W. BOCES area schools.

KEY Program Courses

Courses offered through the KEY Program are taught at the first year college level. These courses are carefully designed by university faculty in cooperation with teachers in the schools and the BOCES/RIT KEY Program administrative staff to ensure that the standards are identical to those sections taught by faculty on campus and that they meet all state requirements.
Students may take the courses for school credit, and courses are constructed in such a way that Advanced Placement credit may be earned by taking the College Board AP Exam and receiving a satisfactory score. Additionally, for certain courses, students who register for RIT course sections and successfully complete coursework through the KEY Program receive RIT academic credit.

In January 1988, Rochester Institute of Technology worked with the schools to deliver the American Politics component of a Social Studies course. Following the success of this pilot semester, the College of Continuing Education and the College of Science at RIT is working with the BOCES to deliver a package of college level, year-long courses beginning in September 1988. The courses are:

- Calculus
- English (Introduction to Literature and Introduction to Composition)
- Social Studies (Economics and American Politics)

Courses consist of five, 40 minute class meetings per week for the school year (divided into two semester courses). RIT faculty design the curriculum, plan day-by-day activities and evaluate individual student performance for each course in consultation with the participating schools. Organizational meetings between BOCES staff, RIT faculty and staff, and teachers from participating schools are held to develop curriculum, procedures, interactive teaching

and evaluation methods. The classroom teachers contribute their experience and understanding of the students and administer school-assigned activities and grades.

Faculty from RIT travel to the participating schools to meet with the students and teachers on a regular basis. Student campus visits and field trips are used to contribute to the instruction and motivation of the students.

Delivery System

Various instructional technologies are used to provide an effective distance learning experience. In keeping with RIT's philosophy of distance delivery and proven ability to offer distance learning, courses offered to students at a distance are of the highest quality. Interaction and flexibility are important components of the courses. To assure quality instruction, faculty are supported and assisted with the logistical arrangements necessary for distance delivered courses. Although students visit the campus infrequently, the curriculum encourages identification with RIT and students receive many of the privileges of on-site students.

Selection of the precise mix of delivery techniques varies from course to course depending upon the course content, instructor's style and available resources. In all cases, university instructors, school teachers and students are fully supported in the use of the various technologies for effective learning. Although the schools approached the university with the idea that two-way interactive television would be the preferred delivery technique, financial considerations and logistical obstacles made this improbable. Early meetings among the superintendents, BOCES and RIT personnel reaffirmed the desire to go ahead with course delivery using more affordable technologies. Enhancing the delivery methods would be possible if the organizational structure was in place supporting an academically sound program. Start-up costs were kept to a minimum avoiding the more expensive technologies.

For the pilot semester, no additional equipment was purchased. Fortunately, telephone lines were in place from a former project and each school owned a speakerphone. In addition, libraries were already equipped with computers and modems which they used to access the BOCES bulletin board. For the first American Politics course, teachers coordinated in-class work and insured students kept up and fully understood the material. Teachers also administered tests, coordinated student projects and led discussion sessions. The university faculty member came to the schools periodically to present special lectures and answer student questions. University visits were coordinated among all schools so that students came together on the same day to participate in seminars with area politicians and to take advantage of university facilities. Other components of the pilot course included videotapes from the *American Government Survey* series, weekly audioconferences with the RIT faculty member, library access via the on-line card catalog and interlibrary loan.

KEY Program courses during the 1988-89 school year will include one or more of the following components:

Prerecorded video demonstrations and lectures
Tapes are produced in RIT studios and/or purchased from educational production houses.

Live two-way audio and audiographic conferences
Live interactive writing systems are used for problem solving and discussion sessions. Students at all sites are able to "go to the board" to work on problems and have questions answered immediately via graphics and audio transmitted over phone lines. Telephone

conferences are used for discussion sessions and especially for teacher coordination meetings.

Computer conferencing & electronic mail
Utilizing RIT's Computer-based Communications system, or the BOCES bulletin board, students are able to communicate with the course instructor and each other. Participating teachers from the various schools are also able to use this flexible communication system to coordinate plans and communicate concerns with each other and the RIT faculty.

Study guides, texts, and other instructional materials
All course components are coordinated by custom designed study guides and outlines. Some courses also use software packages, demonstration kits, and other materials.

Because they are regular RIT courses, or are equivalent to Advanced Placement courses, the offerings are challenging. Students are expected to work at the college freshman level. Students who register to receive RIT credit are graded just as if they were on-campus students; credit must be earned by a passing grade. In every important respect, a KEY Program course is identical to the same course on campus. The learning objectives, testing, coursework and grading standards are the same. With the help of the school teachers from the participating schools, course design and delivery are sensitive to the needs of the high school audience.

Evaluation

Student response to the pilot section has been quite rewarding. Nearly all students felt that the course was a positive addition to their senior year and also indicated that the course met or exceeded their expectations. Students were not happy with the videotapes in the course, with three-quarters reporting the tapes did not contribute to their learning. The audio-conferences, on the other hand, were considered either most important or very useful by 85% of the students. Over eighty-five percent (88%) of the students felt that the in-class teacher was essential or very helpful to the course. In summary, most students agreed with their fellow student who wrote that the best thing about the experience was that it provided "the opportunity to experience college level work."

The school teachers' responses to the program were also good. They enjoyed the contact with the Institute and suggested they would like even more interaction. Teachers liked the opportunity to work with each other and with the college faculty. RIT issued adjunct faculty I.D. cards to the teachers in recoginition of their important role in the course. This allowed them to take advantage of many of the university's resources such as the library, recreation facilities, and reduced prices on speakers and artists series.

Conclusion

Beginning with the full program of three courses in Fall, 1988, PC based telewriter systems will be available to enhance the faculty lectures. Although students in the pilot section said they did not miss seeing the professor and found his lectures interesting even without visual support,this could be due to the nature of the American Politics course. It is expected that calculus and economics, in particular, will rely heavily on the addition of a telewriter system.

Although students found the videotapes to be the least helpful part of the course, the teachers still felt that they provided an important addition to the students' learning. Fewer tapes, or shorter sections of tapes, will be used in the future courses. For example,videotapes currently in production for the calculus course are only ten to fifteen minutes long and illustrate important or difficult concepts.

All students, faculty, teachers, guidance counselors and librarians will be more strongly encouraged to take advantage of the RIT Computer Communications system for administrative and instructional communications, including use of the RIT library facilities. Guidance personnel at the schools and the librarians will be involved more directly with the KEY Program in the 1988-89 school year. Facsimile machines will also be available for quick transfer of important course materials and library documents.

The university found the participation of the BOCES to be essential to the program. Coordination of school schedules, textbook orders, videotape distribution, equipment complications and meeting scheduling are all details which can sabotage a distance learning effort. In addition, financial arangements for the program could be made through one unit. If and when additional schools choose to participate in the program, the system is in place to accommodate their needs. RIT, L.S.W. BOCES, and the three school districts involved have developed a mutual respect and understand which has helped make the KEY Program successful. Without this close working relationship, this type of program would not be possible.

WCU MicroNet: An Educational Computer Teleconferencing System Past, Present, and Future

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HISTORY

MicroNet is a statewide computer network established in 1982 to open communications between scientists at Western Carolina University and science teachers in North Carolina's secondary schools. In our rural mountainous terrain, the schools are small, have few science teachers, and an even smaller resource base for teacher development and student enrichment activities. In response to this situation, MicroNet was initiated to fill the void by providing numerous services for teachers and their students. MicroNet's originators expected that such an innovative approach to communications would stimulate students to become more involved in the sciences and rejuvenate teacher enthusiasm.

MicroNet began as a regional network, supporting one local school. Because of the enthusiasm of the initial users MicroNet was able to expand and now includes schools across the state. The subscriber list has grown to over 75 schools located from one end of the state to the other. Access to the host computer from a subscriber's computer is via a toll free WATS line.

OVERVIEW OF SERVICES

The two features of MicroNet most used by subscribers are the electronic mail and conferencing system. While the mail allows for private, one-on-one communication, the conferencing system allows users to post messages as they would on a bulletin board - anyone interested in the subject of the bulletin board may read it and/or post additional messages. Other features (discussed below) include databases, tutor/quizzing program, and events schedules.

Student Services

Students may compete in the weekly quiz competitions (biology, chemistry, earth sciences, physics, and mathematics); communicate with others using the network (including teachers/students at other schools, WCU faculty and staff, and resource agency personnel) via electronic mail or conferencing; search for research project ideas; take a quiz in earth sciences, biology, chemistry, etc.; or access 'infogems', a database containing scientific trivia. Several schools have formed partnerships as "MicroPals" which encourages students to find and become electronic penpals using the mail system.

Teacher Services
Services offered to teachers include graduate courses, resource databases (earth science, biology, chemistry, physical science, astronomy, and roadshows), electronic mail and conferencing, and on-campus workshops. Teachers may also check the 'schedule' function which posts current events/activities and their respective dates. The conferencing "boards" are often used to post continuing education and summer activities for the online teachers. Resource databases contain information such as demonstrations, laboratories (complete write-ups in some cases), addresses of companies giving away free or inexpensive class or lab materials, field trip activities, or any other information useful for improving teaching skills, materials, methods, etc. The roadshow database contains listings of university faculty or local professionals who have agreed to offer one or more specialized roadshows; and the proj-ideas base contains project ideas for middle or high school level science projects. Another set of specialized databases contain multiple choice questions and their answers. Teachers may create a quick 'pop' quiz by using the 'testmaker' function when searching these databases.

TEACHING AT A DISTANCE

MicroNet began offering graduate level courses in 1983. Western North Carolina is rural and many small communities are located at great distances from a university. Access is often along narrow mountain roads. The rationale for offering courses then was based upon the small number of teachers willing to drive, in some cases, several hours or more each week to attend class. Since their number was often too small to justify a regularly scheduled class, another delivery method was necessary. The new approach allowed teachers to obtain needed credits for graduate degrees, certification, or personal improvement without sacrificing time away from work or personal responsibilities. Originally, continuing education credit was awarded to successful participants. Teachers now receive graduate credit for each course completed.

MicroNet offers one graduate science course each semester; past courses included Recombinant DNA, Earth Sciences, Molecular Biology, Aquatic Chemistry, Stream Ecology and Mentors & Computers (a philosophy course - our first non-science offering). Further expansion into other disciplines remains one of the goals of MicroNet.

Teaching and Learning Processes
Teachers enrolled in MicroNet courses are required to travel to campus three or four times per semester (on Saturdays) instead of the usual sixteen. The initial session provides time 1) for teachers to learn to use the system, 2) to discuss course purposes, activities, procedures, 3) for the students and instructor to begin to know each other, and 4) to resolve any hardware/software problems with their remote computers. Second and third on-campus class meetings afford the opportunity for face-to-face discussions, lectures or laboratory activities. The balance of the coursework is a combination of independent study (with readings in assigned texts and periodicals). The majority of the communication then takes place within a dedicated conference in which the instructor and students may ask questions or discuss materials involved. Multiple choice

tests are administered via computer for immediate feedback of results; essay exams are generally handled by land mail. The last campus meeting is set aside for the final exam and evaluation.

Courses delivered via MicroNet have advantages over both conventional correspondence or time-dependent satellite courses. Advantages of the MicroNet delivery system include the following. First, MicroNet offers direct, daily access to the instructor. Students may connect at any time of the day, any day of the week and leave messages for the instructor in the electronic mail or conferencing system. Instructors 'check-in' at least once per day to answer any questions or post a question of the week pertaining to the current materials. Telephone messages via a third party won't get scrambled or forgotten. Second, In addition to communicating directly with the instructor, students may talk with one another as in a group discussion. This seminar atmosphere enhances the course quality for it allows students to share viewpoints. Third, the on-campus sessions allow students and instructor to meet and to get a personal 'feel' for the coursework.

EVALUATION OF EFFECTIVENESS

MicroNet's tele-delivered courses continue to enroll a larger number of students per class than most on-campus Western Carolina University graduate courses in the sciences. Average enrollment of MicroNet classes remains at about twelve students. Thus, a larger portion of our region's teachers are able to begin or complete a master's or educational specialist degree, or stay current with research in their fields. Many teachers who have enrolled in at least one course have remarked that MicroNet was the only way they were able to take a science class. The success of these courses has become apparent as the class rosters often list veteran student names. It should be noted that these veterans are often the most highly motivated individuals.

A number of problems must still be addressed. Some teachers are not computer literate and are intimidated by the delivery system. They usually do not participate in conferencing activities. Others miss the traditional classroom setting and blame their poor performance on the new technology. There is no training for the university faculty teaching the course. As a result, the success or failure of individual courses is reflected by the enthusiasm the instructor has in the delivery format. Lastly, although the courses and delivery style receive praise from students, MicroNet has not been able to generate interest in using the system from faculty outside the sciences.

FINANCIAL CONCERNS

To this point, funding for network courses has been provided by either WCU or various grant agencies (public and private). The cost for running an on-campus versus a MicroNet course for twelve students is comparable: $5355 and $4835, respectively. However, a very large share of the courses' costs are absorbed by the university and the grants. For example, the average student spends approximately 4.5 hours online per

month. Therefore, the telephone charges alone for a class of twelve exceeds $2000. Should the courses continue to be subsidized or should students pay the extra fees?

Maintenance of hardware/software and equipment upgrades are items being addressed for the first time. Money for such expenditures has been tight. Should such costs be passed on to course participants? If all these additional charges are added to student fees, what will happen to course enrollments?

IMPROVEMENTS ON OR TO THE DELIVERY SYSTEM

Since it is not possible to transmit visual images and verbal communication via computer, an additional delivery tool could be employed by MicroNet to make courses even more effective. Time-dependent satellite transmissions or pre-taped audio/video cassettes can greatly increase the value of each course by helping students "see" and "hear" the subjects they are learning. For example, students enrolled in a foreign language course can hear correct pronunciations; or those enrolled in a mathematics course can see complex mathematical formulae as they should appear. Instructors can perform demonstrations (although not as beneficial as hands-on lab experiments, they help students see reactions of importance). The audio/video cassettes have an added advantage; that is, students can play them as often as necessary to strengthen understanding of the material. With such audio/video integrated with MicroNet, an answer to a question is only a telephone call away!

SUMMARY

MicroNet's computer teleconferencing network, in its rural setting, has opened communications between university faculty and schools, thus providing a valuable service to the region and state. The delivery method has reduced travel time for teachers, enabling them to spend more time and effort in satisfying course requirements.

MicroNet plans to continue expanding its course offerings into fields outside of science. As new state certification requirements are enacted, appropriate courses can be offered to satisfy the needs. Simultaneously, efforts are underway to include a video component into our offerings to help students see and hear the instructor and material.

COOPERATION AND COLLABORATION IN DISTANCE EDUCATION

THE CONTACT NORTH/CONTACT NORD EXPERIENCE

Submitted to the:

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INTRODUCTION

Cooperation and collaboration has the capacity to renew and invigorate distance education with the commitment and resources that have been missing in many jurisdictions. Historically models of cooperation have been effective strategies to assist institutions in overcoming problems associated with technological change. Educational institutions must develop strategies which allow them to participate, compete and lead within the emerging information age without depleting their limited human and capital resources.

These strategies must incorporate the risks and benefits of cooperation. The International Extension College/Council for Educational Technology (1987)[1] has ranked these strategies in relation to risk and potential benefit as follows:

Low risk — Modest Benefits

* Sharing information
* Exchanging experience
* Exchanging advisers and consultants
* Collaborative staff training
* Accepting each other's students
* Acquiring and/or exchanging external materials
* Collaborating on evaluating external materials
* Collaborating on adaption of materials
* Cooperating on development of related course units
* Establishing credit transfer arrangements
* Creating a common open learning system

High Risks — Major Benefits

The Contact North/Contact Nord project attempts to move institutions from the low risk/modest benefit end of the spectrum up into those areas of higher risk and major benefit.

1 International Extension College/Council for Educational Technology, (1987), Commonwealth Co-operation in Open Learning, Commonwealth Secretariat, London, UK.

BACKGROUND AND DESCRIPTION OF CONTACT NORTH/CONTACT NORD PROJECT

Contact North/Contact Nord is a new initiative designed to enhance distance education opportunities in Northern Ontario, Canada. The population of Northern Ontario is thinly spread over a large geographic area. Northern Ontario contains 9/10 of the land area of Ontario but only 1/10 of the population.There are two universities and five community colleges offering post-secondary programming within this region. Each of these institutions has a regional mandate and has developed some limited capacity to deliver programming within the region. This delivery has most often consisted of correspondence, visiting lectures, and community facilitation techniques. In addition, secondary correspondence education has been delivered via correspondence mode from the Ministry of Education's Independent Learning Centre in Toronto.

The central thesis of the Contact North/Contact Nord project is that access to education at all levels could be improved through a combined effort. Further, such an effort, with appropriate resources applied, would create a synergistic effect beyond the resources or capabilities of any one of the participating educational institutions. While at this writing it is premature to comment on the effects of establishing the network, the process and policies of doing so are instructive.

Several ministries of the Ontario government cooperated with the Ministry of Colleges and Universities to establish provincial financial and policy resources for the project. The Minister announced the initiative on October 20, 1986, and gave direction to establish the network on an operational footing by September 1, 1987.

The four year, 20 million dollar pilot project is designed to achieve the following objectives:

1) To improve access to formal educational opportunities at the secondary and post-secondary level for residents of Northern Ontario.

2) To establish a long-term capacity to improve access to other training and informal educational opportunities.

3) To meet the ongoing and emerging educational needs of residents in communities remote from conventional delivery sources by use of new information and communication technologies.

4) To meet the special needs of francophone and native peoples in Northern Ontario.

5) To create new and expand existing expertise in the design and operation of technologically enhanced distance education programs in Northern Ontario.

6) To create models for the alternative delivery of educational services capable of:

   a) application more broadly throughout Ontario.
   b) application to the needs of other jurisdictions, including developing countries.

7) To create a "test-bed" to evaluate the effectiveness of various technologies in delivering distance education.

In northwest Ontario, Confederation College and Lakehead University were asked to jointly establish and administer the Contact North/Contact Nord project as regional contractors. At the same time, Cambrian College and Laurentian University were asked to assume this role in the northeast region of the province.

During the planning process prior to the establishment of Contact North/Contact Nord, several government departments became involved. Gradually the lead was taken by the Ministry of Colleges and Universities, with Education and Northern Development also heavily involved. Two committees were eventually struck: the Provincial Management Group, consisting of five senior civil servants and the Provincial Management Committee, consisting of representatives from seven ministries and the Ontario Educational Communications Authority, personnel from the four northern contractors and the two regional coordinating centres.

A formal process for strategic planning and evaluation has been established to consider long term implications for the future of the project.

COOPERATION IN DISTANCE EDUCATION PROGRAM DEVELOPMENT

Grossman (1987)[2] has argued that delivery institutions should insist on producing and teaching only its own distance education courses. Although Grossman's arguments have merit, the logistics and costs of producing distance education materials and recovering those costs by delivering to large numbers of students, would make participation by smaller institutions in distance education impossible. Only by working cooperatively, in collaboration with other institutions can the members of small faculties accept the responsibilities and earn the rewards of developing their own distance education programming.

A portion (40%) of the Contact North/Contact Nord funding has been allocated to establish the Northern Distance Education Fund. The government intent in establishing this development fund was both to recognize the up-front cost of new programs and to encourage a new development framework. The conditions of application to the fund include the following:

i) priority given to projects undertaken in a collaborative manner
ii) full programs, not courses to be developed
iii) content and delivery methodology to clearly meet northern needs
iv) development of new programs not currently available in Ontario
v) encourage quality development by the use of course team approach

To date 22 projects were approved for feasibility studies and 15 full degree or certificate programs have been approved for funding under the program. Development partners must demonstrate ongoing commitment of resources both in the development and the delivery phases of programming developed under the Fund. The Contact North/Contact Nord delivery network, the "electronic highway" is to be considered by each development proposal, but the proposal may, in turn, further define this network.

All programs which receive development monies under this fund will be delivered in the north of the province by northern institutions. However, by agreement, the entire program is licensed to the provincial government and therefore becomes "public domain" within the provincial educational system.

2 Grossman, David, M., Electronic College Courses - The Professor Must be in Charge, Chronicle of Higher Education, 2-11-87.

The effect of this initiative has been remarkable. Institutions traditionally isolated either geographically, or philosophically are designing situations for collaboration. In one case the two northern universities resolved differing academic perspectives on community health care in their co-development of a professional degree in Nursing (Bachelor of Science of Nursing) to be accredited by both institutions. A program proposal in the field of gerontology originally submitted jointly by five regional community colleges received subsequent support from a provincial association seeking a similar training program.

The requirement to develop programs as opposed to courses, and to avoid duplication has encouraged creative combinations. Lakehead University has, for example, proposed jointly with a university in Southern Ontario to design new certificates in the Professional Outdoor Recreation and Environmental Studies. These certificates will include existing audio-visual materials, newly produced video and non-credit seminars delivered live to regional access sites via teleconferencing.

Benefits arising directly from this co-operative approach have been identified in at least two secondary areas: support systems and professional development. Early in the project, monies were budgeted to improve both the media production and library resources of the Northern institutions. This will allow the implementation of a uniform, automated library service, at the university level accessible across the north of the province. Video production resources at the Colleges will be used by staff and faculty on a cooperative basis to the benefit of both students and programming.

Student support and benefit can be greatly enhanced by inter-institutional planning. Study skills, seminars delivered either by teleconferencing or by face-to-face seminars at access sites are offered to many distance education students. Partner institutions, co-developing a program are able to offer enhanced academic resources; for example, specialized academic expertise can be traded for practical field experience or other specializations.

The collaborative interchange of personnel resources at both the proposal and the program development stages provides a working education for administrative, instructional and support staff. Such collaborative ventures demand both formal professional development at the institutions, and also continuous practice in the skills of problem solving and consensus building.

The issues resulting from this new developmental framework are multiple and complex. Operational definitions of collaboration, course team and ownership or copyright must be resolved from the outset. Traditional institutional concerns arise on matters such as territory, institutional mandates, joint accreditation, academic credibility, funding formulae and credit portability. Policy and politics impact on the selection process, the program scope and flexibility.

To succeed, a development program such as the Northern Distance Education Fund needs centralized planning and sufficient funding to allow innovation. At the institutional level, the administration must support and facilitate change. Finally, the operational guidelines for development must allow flexibility within general parameters to support creative application.

COOPERATION IN DELIVERY

In order to accommodate the widest variety of delivery modes currently in use by distance education delivery institutions in Ontario, Contact North/Contact Nord has configured its network with a heterogeneous collection of educational delivery technologies. A 40 port digital teleconferencing bridge as well as the CoSy computer conferencing system was purchased for each of the two centrally located regional coordinating centres. Each of the 27 access sites is equipped with a teleconferencing convener, a facsimile machine, a video tape playback system and television, an IBM AT and a Unisys ICON microcomputer as well as an audio cassette recorder and telephone answering system. Telewriter II audiographic devices have recently been purchased to enhance the teleconferencing capacity.

From the perspective of the remote communities, Contact North/Contact Nord consists of a small adult education classroom which is available as a study and information centre as well as reception point for programming. The access points are located in a variety of sites including College extension offices, public schools, community training centres and other available locations. The community as well as the local host thus gains the use of the Contact North/Contact Nord equipment and the expertise of the Contact North/Contact Nord personnel. Various community groups and local education institutions must then develop collaborative arrangements to share the Contact North/Contact Nord resources.

The most common mode of delivery currently being used on the Contact North/Contact Nord network is print and audio tape packages supplemented by audio and computer conferencing. The facsimile machines are being used for rapid turn around of student assignments and tests.

The role and skill of the local community Site Coordinator is of crucial importance to the Contact North/Contact Nord project. The Site Coordinator completes the cycle of cooperation by facilitating collaboration between institution and community learners. The Site Coordinator acts as an information resource, technician, librarian, counsellor, referral service and janitor. The Site Coordinator, as the key community contact must have well developed personal skills as well as credibility and knowledge of the local community in which they work.

The Site Coordinators also serve as community contact points for delivery institutions. Besides assisting in promotion and referral they have an important role in focusing and defining the educational needs of their own communities and feeding that information back to delivery institutions.

The Site Coordinators work 20 hours a week, sharing their work hours between starting and monitoring the delivery of audio conference courses and maintaining regular office hours. The evening office hours allow learners to work with the educational tools located at the access sites as well as meet with the Site Coordinator and other learners for group support, counselling and information.

Contact North/Contact Nord provides additional human resources to enhance distance education creation and delivery. Two Instructional Designers have been hired to work in a consultative role with course teams developing new distance education courseware. Two Secondary School Liaison Officers work with the public school system, assisting in delivery of teleconferencing courses and in the development of pilot projects. Their has been considerable interest shown in the project by principals struggling to offer complete high school programs within very small communities and schools. These professional staff also conduct a variety of inservices designed to assist faculty in acquiring the skills necessary to develop and deliver new distance educational programming.

One of the goals of the project is to enhance programming for targeted groups within Northern Ontario. For this purpose a Francophone liaison Officer as well as a Native Liaison Officer have been contracted to work with community and educational groups to develop and deliver distance education programming.

The Future

This pilot project ends on Mar 31, 1990. Decisions on its future are expected in the fall of 1989 after the evaluation processes are completed. A major issue to be addressed will be the collaborative process, in program development and in the administration of the network. There is no doubt that when resources are scarce and existing institutional mandates can be preserved, sharing makes sense. However, close collaboration requires extra financial resources and institutional and personal commitments. Regardless of the long term decisions taken, collaboration has been remarkably effective to date, as a 27 point network offering over 40 courses was created in less then one year and 15 major development projects were funded.

Such achievement requires considerable institutional support. that Contact North/Contact Nord has come so far in such a short time speaks to the need it has begun to fill and the fact that both institutions and individuals have been prepared to learn new patterns of cooperation to achieve mutually beneficial goals.

CONCLUSION

It is still early to assess the impact and effectiveness of the Contact North/Contact Nord project. In simple numbers, more citizens of Northern Ontario will have accessed secondary and post-secondary educational opportunities. Learners will have access to a broader range of educational activities and delivery institutions and faculty will have had an opportunity to participate in the development and delivery of quality distance education programming. The Province of Ontario, for its investment will have pioneered an advancement in knowledge concerning the application of emerging communications technologies. It will also have invested in the development of high quality distance educational programming and most important in the development of people - both learners and educational developers and deliverers.
De Bono, in his treatise on Future Positive summarizes:

> "We need to nurse new ideas and let them develop to a stage where their potential can be addressed. We need to develop testbeds for ideas, for otherwise an idea can only be judged within the existing framework of experience and its potential will be missed if it is the sort of idea that changes frameworks. We need to encourage plurality, options and choices rather than seek to standardize development. Above all we need to dispel the myth that there is enough creative, constructive effort around and that a good idea will have its due effect."

3 de Bono, Edward, Future Positive, A Book for the Energetic Eighties, Penguin Books: New York, 1980. pp 232-3.

Change Strategies for Technology Adoption
in
University Setting

by

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In 1987, the Institute of Agriculture, Forestry and Home Economics (IAFHE) at the University of Minnesota began developing a plan for delivering credit and non-credit educational offerings at multiple location in Minnesota. This interim report describes the approach taken and examines policy issues and administrative strategies which proved significant.

The Telecommunications Development Center (TDC) assisted the vice president of the IAFHE and his council of deans and chancellors in conducting background research, and TDC developed a set of distance delivery alternatives for consideration by the vice president and council.

The Telecommunications Development Center is administratively part of the IAFHE. With a five-year grant from the W.K. Kellogg Foundation, it has been charged with conducting and evaluating applied research using new and emerging electronic technologies for education. During 1986 and 1987, TDC focused on assessing faculty needs related to effective use of new technologies, designing and delivering seminars and workshops to faculty and other Minnesota educators, and providing technical assistance and financial support to a series of demonstration projects.

Beginning in 1988, increased emphasis has been given to designing and conducting research that will allow the Minnesota Extension Service as well as the Cooperative Extension System to identify and appropriately use those educational technologies with the greatest potential to address extension delivery issues.

Situation

The Institute of Agriculture, Forestry and Home Economics includes three colleges in the Twin Cities, the Crookston and Waseca campuses, the Minnesota Extension Service (including 90+ county offices), the Agricultural Experiment Station (including six branch stations) and several other facilities located throughout Minnesota. The institute offers undergraduate, graduate and professional education, conducts and reports research, and provides opportunities for outreach and continuing education. Many of these educational opportunities are unique within the state.

Since 1985 along with the rest of the University of Minnesota, the Institute had been engaged in a process of conscious planning and redesign. At the same time, the availability of technology systems increased tremendously. The challenge to the institute was to implement the planned changes in a complex educational environment -- one that included rapidly evolving technologies, increasing demands from nontraditional students, and new relationships among post-secondary institutions and, indeed, educational institutions of all types.

PHASE ONE
Approach

In the last fifteen years, the study of educational technologies and their impacts on students has yielded a large body of literature. The bulk of it focuses on descriptive studies oriented toward achieving control of the interactions of specific media, contents and learner characteristics. Relatively little of the published material deals with institutional issues or related policy matters. A 1987 publication by the Western Interstate Commission for Higher Education (WICHE) identifies fewer than 30 publications which significantly address these concerns, and several of the identified publications are descriptive rather than evaluative or analytical. (State Higher Education Policies in the Information Age, edited by Mollie McGill and Richard Jonsen.)

To prepare the plan information was gathered from key Institute faculty (department heads and others) through in-depth interviews. These interviews were designed to elicit data related to several broad areas:

- target audiences currently unreached or poorly reached
- emerging audiences
- problems faced in instructional delivery
- amount and nature of interaction among institute units and between institute units and other University units
- concerns related to instructional technologies
- specific opportunities or applications of interest

If not obvious from initial responses, additional information was sought relative to five specific types of educational situations: upper- and lower-division undergraduates, graduate, extension/outreach, and research. More than 40 persons participated in the in-depth interviews. Approximately 40 other faculty were involved in less formal exchanges which contributed to the plan. The goal was to elicit as many relevant responses as possible to the broad issues listed above.

Distance delivery, as used in the resulting plan, was assumed to include the broad array of methods and media which permit learners and instructors to interact around a common context without regard for intervening time and/or distance. Distance delivery technology includes devices and systems such as computers, two-way television and various hybrids as well as radio, audioconferencing and other electronic media.

Rational

This approach - that is the selection of both method and subjects - was taken not just because of its potential to elicit needed data but also because of the strategic advantages it offered. Department heads were excellent sources of information about departmental enrollment trends, teaching strengths of the faculty and programmatic priorities. While providing this information, they could be exposed to specific technologies and the overall possibilities for distance delivery.

Involvement of department heads and other faculty opinion leaders fostered their interest in the process and helped to create acceptance and, in some instances, ownership of the resulting recommendation. Their involvement also allowed potential early adopters (both individuals and departments) to be identified. Finally, it helped to get a measure of some of the attitudes and perceptions that would have to be accommodated if plans for distance delivery were to be implemented.

Findings

Findings across colleges and units were quite consistent. Three audiences were consistently identified as of great importance: practicing professionals, nontraditional undergraduates and the Institute faculty itself. There was agreement that these groups are currently poorly reached and that the need to reach them will continue.

For some departments/programs the potential professional audience is large, numbering in the thousands; for others, it is small but important. The individual members of this audience are presumed to be highly motivated, and the main barrier they face in accessing the Institute's education offerings is distance.

The nontraditional undergraduate audience was often identified. Among the subgroups mentioned were: graduates of 2-year institutions, urban students, including minorities, who may not be aware of Institute opportunities without some intervention; and working adults who may or may not overlap with the first subgroup. While parts of this audience may be accessible through institutional sites (schools, colleges, employers), there is probably need for some delivery through individually directed media.

The Institute faculty is an audience for graduate-level, degree-related coursework (especially extension agents), for professional updating through, for example, pro-seminars conducted by UM faculty or others (potentially all), for enrichment of the traditional classroom experience through greater participation by individuals at non-St. Paul locations, and for specialized, non-degree training (specialized agents and coordinate campus faculty).

Opportunities

Opportunities identified in the study fall into two categories -- probable facilitators of technology adoption and probable benefits to other populations of such adoption.

Many of the strategies and planned outcomes described in the collegiate planning documents and now named as priorities by the University will facilitate the move toward identification and adoption of appropriate educational technologies. Project Sunrise and other less articulated plans for curriculum review and revision will provide incentives to departments and individual members of the faculty to redesign courses and whole knowledge bases for delivery in nontraditional, non-classroom settings. Downsizing should allow some faculty to be reassigned to distance delivery efforts.

Barriers

Perceived barriers to greater use of telecommunications technologies ranged from the nearly ridiculous to the possibly insurmountable. The three issues which came up across colleges and units were time, money and fear. Common wisdom tells us that younger faculty members, provided they have achieved tenure, will be likely to welcome new technologies, or at least accept them, and the older members of the faculty will avoid new technologies at any cost. TDC and some other researchers have found that there are serious weaknesses in this "wisdom", but it is true often enough to be of concern.

Concerns about time surfaced in several forms. One, that curriculum revision will be an add-on activity and that greater time requirements to allow for redesign for technology-mediated delivery will be too much to expect of anyone. A second concern was that, at least initially, greater amounts of time would be required to deliver a course or program using technology. A third issue related to time was the possibility that courses would have to be offered at "less convenient" times, for example, early mornings, evenings or week-ends.

In viewing money as a barrier, informants voiced concerns about absorbing the real, even if indirect, costs of course redesign. They also identified the high cost of hiring media developers and computer programmers. Few had any ideas about options for funding these particular types of activities. There was a general perception that most technologies are too expensive to consider especially in light of their short shelf life.

Fear of technology is potentially a barrier for some portion of IAFHE faculty and staff. Unwanted adjustments in teaching practices, concerns about negative impact on the tenure and promotion process, legitimate questions about educational quality will all arise with the selection of a technology or system for use in the Institute. Technical support, a sequenced phase in, training and exposure will act to remove many of the fears.

Recommendations and Alternatives

The recommendations which TDC developed included a range of alternatives representing a broad spectrum of costs, technologies and start-up times. All showed potential to reach the high-needs audiences identified in the study.

One of the strategies used in preparing the recommendations was to indicate others at the University of Minnesota (or other educational systems) who would be likely collaborators in using the same or similar delivery system. Though this component was often known only through anecdotal means (ie. inquiries from other units referred to TDC), it served to reinforce feasibility and lessen perceptions that certain technologies were still many years from being usable or useful.

(Fifteen options were included in the original study: "Potential Electronic Delivery of Education for the Institute of Agriculture, Forestry and Home Economics: Opportunities, Recommendations and Issues" (TDC, February 1988). A research report incorporating the study report as well as this paper will be available from TDC (43 Classroom Office Bldg, U of MN, St. Paul, 55108) in October.)

Another strategy used in the report was to examine a number of statewide activities in the area of distance/electronic delivery and to use these as a context for raising significant policy issues. These issues ranged from the need for university and inter-system coordination to specific policies relating to the awarding of graduate credit for non-traditional offerings.

At the time of data collection three of the state's agencies and independent units were conducting discussions of statewide needs regarding telecommunications in education. Since that time, one agency has refocused its plans and the other two are collaborating on a joint needs assessment. The University has not yet identified a structure or other mechanism for coordination; informal but regular contacts among a handful of key players (below the level of vice presidents) is resulting in briefings for University decision makers and, so far, de facto coordination.

PHASE TWO

Phase Two in the strategy for technology adoption had two parts. One included extensive circulation of the plan and a request for comments and reactions. This encouraged many academic departments and other units to hold discussions of all or portions of the plan resulting in identification of a few new opportunities and strong general awareness of the topic of distance/electronic delivery.

The second part of Phase Two strategy had the executive council reviewing the recommendations and considering several indepth. Ultimately this body --after requesting and previewing various levels of videoteleconferencing and two-way television decided to support small-scale use of several low-cost options and to concentrate on a major budget request to support one-way video teleconferencing via satellite with two-way audio.

PHASE THREE

Phase Three of the project is now underway. A budget request is undergoing internal, University review and additional collaborators are being sought from collegiate and other units outside IAFHE. The budget request includes capital expenses to install an uplink and 100+ receiving dishes, to create a classroom and studio for program origination, and to purchase the equipment necessary to develop and produce broadcast-quality video. The budget also includes a request for recurring funds to staff and operate the facilities.

As this budget clears University hurdles, faculty and department heads are being asked to identify specific credit courses and other programs for priority delivery. This information along with the findings from the initial study will be used to inform the legislature. Between now and July 1990, when legislative appropriations would become available, an interim operating budget will support limited satellite use and, more importantly, the review and re-design of specific courses for satellite delivery.

TDC has continued to play an important role in the process of encouraging appropriate technology adoption. In developing and helping to defend the budget request, TDC has drawn upon its own experiences and those of other distance educators to ensure that the promises made are realistic.

REPORT OF THE UNIVERSITY OF WISCONSIN SYSTEM TASK FORCE ON TELECOMMUNICATIONS

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The University of Wisconsin System Telecommunications Task Force was established by President Kenneth A. Shaw in April, 1987. Comprised of thirteen members, Task Force representation included Universities, two-year Centers, and statewide Extension. Its twofold charge: (1) Evaluate the UW System's administrative, instructional, research and extension requirements related to new and emerging communications technologies; and (2) Develop a plan to meet current and future needs through appropriate applications of such technologies.

To carry out its charge, the Task Force identified current communications activities and capabilities within the UW System and other state agencies; and reviewed new and emerging technologies for current and potential applications to administrative, instructional, research and extension requirements.

In a dozen meetings and in 19 public hearings over a period from May, 1987 through August, 1988, the Task Force collected extensive information and comments related to its responsibilities. This information gathering included reports of current and planned uses of telecommunications technologies at and among UW System institutions; and detailed briefings from related state agencies, i.e., Educational Communications Board; Department of Administration; Vocational, Technical and Adult Education System; and the Department of Public Instruction.

A major event on the Task Force agenda was a January 27, 1988 seminar/demonstration of state-of-the-art telecommunications applications pertinent to instruction, research, outreach, and administration. That program was made available to UW System administrative staff and institutional representatives, legislators, state government officials, state agency administrators, and their delegates. Nearly 200 people attended.

A telecommunications technology inventory was compiled, to provide information about facilities and capabilities at each of the 26 UW System institutions and in Extension. The Task Force also collected information on telecommunications systems in other states and university settings similar to Wisconsin. Those findings confirmed that designing and building a telecommunications system, while complex and expensive, is a highly worthwhile endeavor.

Besides estimates of cost, examination of other states and universities revealed a high degree of similarity as to needs and issues related to telecommunications system planning and implementation. Generally, as with the UW System, each entity surveyed was attempting to: extend campus boundaries and program delivery; share resources; and achieve greater management effectiveness through cost containment. Issues in network implementation were similar across locations. All were concerned about equipment and operating costs, system management, and the impact of continuous technological change.

EXECUTIVE SUMMARY

The University of Wisconsin System looks to telecommunications as a means to address a variety of concerns into the next decade and beyond. These include:

- **Maintaining excellence of instruction while attracting and retaining high-caliber students and faculty;**
- **Delivering programs in a cost-effective manner to qualified students regardless of income or geographic location in Wisconsin;**
- **Providing support for research through greater access to computing resources, to libraries and other information sources and for sharing of research findings via electronic mail and computer conferencing;**
- **Enhancing the Wisconsin Idea by making university resources more available via telephone, television and computer technologies;**
- **Integrating UW System institutions into a management information system network for more efficient academic and administrative functions; and**
- **Forging public-private partnerships for regional and statewide economic development initiatives.**

These concerns are occurring in a time of technological, regulatory and economic change in the telecommunications industry, both nationally and in Wisconsin.

Nationally, satellite video is increasingly utilized for everyday business and educational purposes, not just for broadcast television and military training. Fiber optic transmission routes are being expanded and extended. All-digital technology is emerging as the primary transmission mode for voice, video, data and facsimile.

In Wisconsin, the state telephone and data networks that principally serve the specialized needs of state agencies are being rebuilt by the Department of Administration (DOA) for digital transmissions. The Educational Communications Board (ECB) is constructing Instructional Television Fixed Service (ITFS) systems throughout the state and assisting with the acquisition and operation of a satellite uplink facility in Madison. The Vocational, Technical and Adult Education (VTAE) system is expanding its ITFS systems and satellite reception capabilities. The Department of Public Instruction (DPI) is working with ECB and other state and federal agencies to bring telecommunications services to rural elementary and secondary schools. The Wisconsin state lottery will probably be the impetus for creation of the largest telecommunications network in the state.

In the University of Wisconsin System, a strategic planning group mandated by the Board of Regents has completed a study and recommendations for a management information system linking institutions and central offices. The library automation project is nearing conclusion. Several institutions are planning for access to national and international electronic mail networks. Construction of a satellite uplink facility in Madison will provide a means for delivery of programming throughout the state and around the world.

In recognition of these developments and of the critical role of telecommunications in addressing the needs of the University of Wisconsin System, President Kenneth A. Shaw established the UW System Telecommunications Task Force in March, 1987, to:

1. Evaluate the UW System's instructional, research, extension and administrative requirements related to new and emerging communications technologies; and
2. Develop a plan to meet current and future needs through appropriate applications of such technologies.

To carry out its two-fold charge, the Task Force:

- Evaluated the electronic technology environment and its possible relationship to specific educational needs;
- Assessed needs that should be addressed by using telecommunications to improve educational effectiveness;
- Identified telecommunications applications most appropriate for meeting UW System needs;
- Developed a UW System telecommunications plan responsive to those needs; and
- Prepared a cost estimate analysis regarding expenditures to acquire, operate and maintain new and emerging technology-based educational systems.

The proposed telecommunications network represents a consensus of how telecommunications can meet the instructional, research, extension and administrative missions of the UW System. It is based on a 16-month program of interviews, needs assessments, public hearings and applications demonstrations, including examination of other states' plans and activities. Additional insights and participation were provided by representatives of related state agencies: the Department of Administration, the Department of Public Instruction, the Vocational, Technical and Adult Education System and the Wisconsin Educational Communications Board. The Task Force plan also recognizes the findings of the Management Information Systems Strategic Planning Task Force (MIS) with reference to data network needs.

The telecommunications system plan focuses on four areas: Data Networking; Video Delivery and Audiographics Conferencing; Institutional and UW System Infrastructure; and Multi-Year Development.

Data Networking

Recommendation #1: Establish academic and administrative data networks.

From the outset, this Task Force has focused primarily on those applications of telecommunications technology most closely related to interconnection— the transport of information between points, not the production or processing of that information. To the extent possible under the rubric of interconnection, the strategies of the MIS group have been accommodated in this report and plan, particularly with regard to points of interconnection and transmission capacity. Additional funds for planning, equipment, software, maintenance and personnel will be needed to bring the entire MIS plan to fruition.

The focus of the MIS group has been on administrative data networking. Recommended implementation activities and funding needs for management information systems beyond the scope of this telecommunications plan are discussed in the MIS report prepared for the Board of Regents, at whose direction that study was conducted. Plans for and implementation activities of the telecommunications system and the management information system will be closely coordinated to ensure maximum cost-effectiveness and design efficiency. Both academic and administrative data networks are required. All efforts will be made to integrate systems wherever possible, but a single network solution may not provide the required speed or level of connection needed for all functions. Therefore, two strategies, but not necessarily two stand-alone systems, are proposed.

An academic data network is proposed to provide:

1. faculty and student access to library catalog holdings and other database resources at each institution;
2. researchers at any institution with the capability to send and receive electronic mail and research data to and from their peers within the UW System or around the world via computer networks currently available at only a few locations; and
3. links to regional institutional computing resources and "gateways" to external supercomputers and other specialized resources for faculty and students without regard to campus location.

An administrative data network is proposed to provide:

1. data file transfer (payroll, accounting, personnel and student records) between institutions and central administrative offices;
2. access to student, curricular and financial aids databases;
3. development of and access to integrated UW Centers student records, registration, financial aids and inventory databases; and
4. a UW Systemwide electronic mail network.

Video Delivery and Audiographics Conferencing

Recommendation #2: Develop video delivery and audiographics conferencing capabilities.

Two-way still-image video and audio conferencing capabilities are proposed at all UW System institutions and central administrative offices to provide for:

1. administrative and faculty conferences among institutions;
2. delivery of quality instruction to specialized and/or low enrollment courses across institutions, especially within UW Centers; and
3. credit and continuing education outreach to suitably equipped business, industrial and community facilities.

Broadcast (full-motion) video interconnections are proposed to:

1. link selected UW System institutions to Instructional Television Fixed Service (ITFS) systems and/or educational access cable television channels in their communities to deliver instruction and outreach programming; and
2. provide greater access to commercial video carrier networks and/or satellite uplink facilities from UW System production sites and other video production resources to allow for wider dissemination of UW System programming.

Satellite video reception equipment is proposed for all UW System institutions and Cooperative Extension Service (CES) offices, to provide:

1. reception of video instruction and teleconference programs originated at UW System production centers and research institutions, as well as specialty programming from university Centers of Excellence within the UW System;

2. reception of teleconferences and other programming from other states, and foreign language programs from other countries; and
3. delivery of Cooperative Extension Service programming from institutionally-based faculty to county office viewing facilities.

Digitally compressed, two-way motion video is proposed between selected institutions to support interactive teaching applications where two-way motion is a required element of the instruction. As transmission and compression equipment costs fall, additional sites will be included.

Orderly expansion of the telecommunications network to an all-digital voice, video and data backbone connecting UW System sites will allow for online, interactive computing and transmission of graphics-intensive computer information between institutions. In addition, it will allow linkages to emerging high-speed national computer networks from any UW System institution, extension of full-motion video connections for live interactive statewide video instruction and conferencing and two-way digitally compressed motion video facilities at each UW System institution.

Institutional and UW System Infrastructure

Recommendation #3: Establish and provide staff support for a UW System Telecommunications Coordinating Council.

In addition to proposing the elements of a needs-based, flexible, cost-effective and universally accessible telecommunications network, the Task Force also recommends the creation of an ongoing telecommunications working group to formulate policy and operating guidelines, to carry forward to completion the development of a detailed telecommunications system plan and to work in concert and coordination with implementation activities pertaining to interconnection aspects of the proposed management information system.

The Task Force charge did not specifically include examination of issues related to institutional infrastructure. However, the creation of a modern network for delivery of communications among institutions is only a partial solution to needs that can be met by telecommunications applications. Institutional planning for internal coordination and integration of telecommunications utilization is essential. Equally important is the physical capability to receive, distribute and send out information, as well as the resources to create instructional materials and to pay for the maintenance and communications charges associated with the proposed networks. The absence of adequate resources at the institutional level will dictate financial support from sources other than base budget reallocations. There is also a continuous need for training of faculty and staff to use various telecommunications media. Many institutions already have significant infrastructure elements in place, providing a foundation for further development.

Implementation of the proposed telecommunications network will link existing resources to provide immediate benefits while developing mechanisms for selecting new communications systems. The plan is designed to evolve into an all-digital voice, video and data network. It provides for linkages between UW System institutions and the communities they serve, enabling delivery of local and statewide programming to off-campus learners, to business and industrial sites and to the public.

Multi-Year Development

Recommendation #4: *Develop and implement the telecommunications network plan over a five-year period.*

To accomplish the aims of the network in an orderly and cost-effective manner, the Task Force proposes that it be implemented on a five-year, three-biennium schedule. Total estimated cost will be approximately $16 million. Immediate benefits can be realized by using existing resources, such as the State Telephone System (STS), broadband computer networks and international research links, while future communications facilities are being reviewed.

It is difficult to detail technical specifications in an environment where equipment capabilities and costs, as well as regulatory constraints and incentives, change each month. However, the Task Force has defined a number of model network capabilities and pricing structures. The UW System need not own or directly operate the proposed data and video interconnections. The Wisconsin Educational Communications Board and the State Department of Administration networks may meet a majority of the UW System's telecommunications needs for instruction, research, public service, administration and extension.

The Task Force recommends a series of technical and traffic studies, and detailed negotiations with existing state and private carriers and with other educational agencies, as an immediate follow-up to this report. However, for planning purposes, this report includes cost estimates of proposed network facilities based on today's technology, equipment and operating expenses.

The proposed UW System Telecommunications Network will provide a cost-effective mechanism for the delivery of UW System services and will serve as an "electronic backbone" for future services. It is designed to evolve into an all-digital voice, video and data network, while recognizing the unknowns of future technology development. It promotes an integrated approach to academic and administrative computer communications by calling for interinstitutional agreement on protocols and data formats before network construction. It also links UW System institutions and their communities for delivery of local and statewide programming to off-campus learners, to business and industrial sites and to the public through cooperative efforts with the Vocational, Technical and Adult Education System and the Educational Communications Board.

This telecommunications system is a necessity if Wisconsin is to remain competitive in attracting and retaining world class scholars, in providing quality education to its citizens and in providing a communications infrastructure as important as physical highways and transport systems in the effort to retain existing jobs and attract new industry to Wisconsin.

INFORMATION TECHNOLOGIES: SHAPING STATE POLICIES TO SERVE RURAL LEARNERS

Patricia Dewees Ohio University

Educators who serve rural learners with their programs need to be advocates for state wide planning of telecommunications networks to deliver education and training.

IMPORTANCE OF STATE WIDE PLANNING

The Director of the Virginia Department of Information Technology ,Lemuel C. Stewart, gives four reasons for state wide planning for telecommunications:

"First,new forms of technology are rapidly emerging ...

"Second, these developments show great potential for improving the quality of education, jobs and citizen services while reducing the relative costs.

"Third,the uncertainty and economic impact caused by the accelerating costs of current technology represent a clear and present danger to managerial effectiveness.

"Fourth, the absence of a unified and coordinated strategy for managing the State's several telecommunications investments will lead to greater redundancy,additional cost increases and under utilization of official resources." (Department of Information Technology,Virginia,1985).

High costs have been the impetus for several comprehensive state wide planning efforts. Indiana is developing a backbone network utilizing fiber optic cable to tie together state agencies and public institutions in a system estimated to save the state $25 to $250 million over a ten year period.(Mingle,1987)

Elected officials have an interest in cost savings and in the election issue of "education and training." Legislative initiatives have proposed or funded state systems in Kansas ,Virginia,Connecticut,New Jersey, Indiana and Oregon. Systems range from state contracts with a private satellite services vendor (Texas) to a state owned interconnect micro-wave system linking all schools, government agencies and many industrial workplace locations.(Virginia).

In those states without policy direction,the decentralized and competitive development of instructional technologies almost guarantees that the less affluent rural areas will be left out of the services.Ralph Mills, Dean of Extended Education, the California State University, points out further harm.

"Other potential problems include:duplication of efforts,the development of `have' and `have-not' programs and

institutions,confusions of institutional mission and service area responsibilities." (Mills,1987)

Issues identified by the Western Interstate Commission on Higher Education (WICHE) as appropriate for state level attention in a state's plan for information technologies in higher education include: needs assessment,quality standards,program coordination,outcomes assessment,faculty workload policies and equity and access.(WICHE,1987).

A particular concern for continuing education professionals is the way in which state funding formulas structure the continuing education budgets to foster or interfere with efforts to use telecommunications to reach undeserved learners. In the state of Texas for example, almost all telecourses,credit and non-credit are offered by community colleges which can receive full FTE funding for off-campus offerings. Texas universities which must be self-supporting in off-campus programming,offer very few mediated courses.

EQUITY

State wide planning does not address all the issues affecting the delivery of mediated education to rural areas. Even if the network is in place, for the most part, the exemplary projects serve the traditional continuing education population of individuals who have been previously involved with education and have at least moderate income. Professional continuing education has been the need targeted by most projects. White collar professional are the single largest category served off campus via information technologies. (Lewis,1985,5).

Rural communities do need continuing education resources for professionals who live and work in these communities.The Intermountain Community Learning and Information Services Project (ICLS) needs survey conducted in four small mountain communities found that almost half of the respondents said that their educational needs were not being met and most indicated a need for job related information. About a third of the respondents said that their occupations require certification and half said they require periodic updating.(ICLS,1986)

Exciting new technologies ,however, may have limited access to the rural groups most in need. It is not feasible to ask laid off coal miners and bankrupt farmers to run out and buy a microcomputer for class room use. "...the introduction of technology into systems serving rural adult learners may exacerbate problems related to equity by making educational opportunities available only to those with satellite dishes,VCR's,previous educational experience or some combination of the three." (Emory,1986)

In the best of times,rural communities often lack the infrastructure needed by a technology based system-phone

lines,cable systems,even roads are neglected beyond the city lines."The poor quality and high cost of long distance telephone lines in many rural areas prevents adults from participating in learning activities that require the transmission of data by phone. In addition party lines add to the difficulty of using phones." (Emery 1986)

Many telephone based technologies that would appear to be extremely useful have been placed in jeopardy because of increased tariffs resulting from divestiture and telephone deregulation. Heritage College, a small college in rural Washington attempted to deliver teacher training courses to remote sites using slowscan, a video system which is transmitted over telephone lines.

This program which was funded in 1983 by the Fred Meyer Trust Foundation allowed rural teachers, many of them native American and Hispanic to remain in their own small communities and continue their training.By the second year of de-regulation, the telephone bills forced Heritage to reduce their course offerings via this technology.(personal communication,Dr. Rose Arthur,Heritage College,July 1986).

Federal policy is an arena where state policy makers can represent the interest of the entire state including the rural constituency. "one role state agencies might play before licensing bodies that are allocating space on new cable or TV franchises is to serve as a source of expertise and advocacy for local educators..." (Cross,1985)

A small rural college may not have much clout as a telephone or cable customer, but when they are allied with major state universities, service providers will be more attentive to their concerns.The threat to the cost effectiveness of telephone based technology is quite serious since that is the technology used most often to build interaction into a distance learning system.

HITCHHIKING SERVICES

In an ideal world, funds for rural community education would allow the schools,for example, to offer community continuing education via a satellite system during the evening and weekend hours. The Texas "TI-IN" Network actually does something similar in delivering continuing education to rural teachers on the same system which was contracted to deliver curriculum enhancement to rural elementary schools.(XX)

Even in our less than ideal society,the potential exists for "piggy-backing" rural education on systems that are subscribed by more affluent constituencies. For example, Ohio University has been able to use the "sub-carrier" of its regular licenced PBS FM station to deliver programming to one of its regional branch campuses in Appalachian Ohio. (personal communication,N.J.Welling,summer,1988).

The Kansas Telenet audio-conferencing system operates on a self supporting basis and underwrites part of its community educational programing with revenue from the sale of non-prime time used by high schools, government agencies and the private sector who use the network to deliver professional continuing education to the workplace. (Lewis,1985,139).

Taking advantage of the unused capacity of an existing service is a very good strategy for educators trying to serve rural populations. However,The telecommunications environment has been in great flux during the Reagan era which endorses deregulation. In every case- cable, ITFS,telephones,etc.- the profit motive has not served either education or rural communities well. The Federal Communications Commission (FCC) has given to private enterprise a bigger share of the broadcasting spectrum once allocated to education . This is another arena where state coordination can be effective,in this case as a lobbying presence in Washington.

QUALITY ASSURANCE

The task force reports and policy drafts which have emerged from state planning efforts in telecommunications emphasize quality assurance, a traditional role of state agencies. In fact, for SHEEO offices, this issue is at the top of the list. "Supportive Objectives: 1. to develop guidelines which address the issue of academic quality." (Arkansas Post Secondary Educational Telecommunication Taskforce,1986)

One of the very first comprehensive state policy regulations on televised instruction is the Texas Higher Education Coordinating Board's "Subchapter J" which starts out"5.191. Scope and Purpose:(a) This subchapter is designed to encourage the development of television for educational purposes while ensuring a level of quality equivalent to that of regular on-campus resident credit instruction."

For continuing education practitioners,the issue of quality has more to do with affordable software and cost-effective support services. However, practitioners must be aware and responsive to the concerns of state agencies about "academic quality" and be prepared to address these familiar issues in the context of education delivered via information technologies.

For learners in rural areas, the quality issue is really quite different. It might be summarized as "Compared to what?" For these learners whose options are very limited, a well organized telecourse offering is preferable to a long commute in bad weather or a weak course taught by a poorly prepared adjunct instructor.

The findings of a West Virginia University Study team are instructive in this regard. Students enrolled in off-campus programs delivered to rural areas in a variety of modes including telecommunications, rated the quality of instruction very high;their negative response related to student services

including student advising, record keeping,securing texts and library materials and just obtaining general information about schedules and instructors. Ironically, faculty interviewed for the same study did not mention these items in their critiques. (Grasse,1985)

It has become a truism that continuing education is a requirement for America's workforce and for a healthy economy.For a rural America in economic crisis the need for continuing education services is critical. The promise of information technologies is the very real potential to meet that need through state wide planning.

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